THE ENGINEERING AND MINING JOURNAL.

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NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

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AMERICAN INSTITUTE OF MINING ENGINEERS.

OFFICIAL BULLETIN.

MEMBERS and Associates elected at the October meeting of the Institute in Philadelphia are hereby informed that prompt acceptance of election, accompanied by the payment of annual dues, is desired. Notification of election, with blank form of acceptance, was mailed to all elected at this meeting on November 1st. In case of acceptance not being received by the Secretary by November 30th, the sending of the ENGINEERING AND MINING JOURNAL will cease.

NOTICE TO MEMBERS AND ASSOCIATES.

A PART of the edition of the fourth volume of Transactions of the Institute will be bound in half leather and furnished to members at fifty cents for binding. The volume will be ready for distribution early in January, and members are therefore requested to give notice at once to the Secretary if they wish bound volumes; otherwise, uncut volumes in paper will be mailed as usual.

LAFAYETTE COLLEGE, EASTON, Pa. THOMAS M. DROWN, Secretary.

CORRECTIONS.—Mr. HOWE begs to say that the classification of irons to which he objected (see p. 341—lines 14-16 from top second column) was the "old classification as defended by Mr. METCALF, and *not* the *proposed* one."

In article on *Pumping Engine Tests*, page 344, lines 28 and 31 from bottom of second column, for 5,400 read 4,156.

ATTENTION is called to the card in another column announcing that the Scientific Publishing Company has been appointed sole agent in this country for the mining journal *El Minero Mexicano*, of the City of Mexico. Mexico, probably the richest country in the world in the precious metals, is even now becoming one of the most important foreign markets for machinery, tools and hardware, and the great reduction in cost of manufacture which has been effected here during the past few years will greatly increase our exports in that direction. With such prostration in our home markets, it behoves our manufacturers to take advantage of this new and inviting market, where all transactions are for *cash*.

A BELGIAN VIEW OF THE AMERICAN IRON INDUSTRY.

The Brussels *Moniteur des Intérêts Matériels* for Sept. 17 contains a letter from Philadelphia, evidently written by M. JULIAN DÉBY, the accomplished editor of that journal, and chiefly devoted to an analysis of the iron industry of this country. The old saying, *Fas est ab hoste doceri*, may apply in this case. Though we could scarcely consider M. DÉBY in the light of an enemy, his survey of the field will be interesting to many who do not agree with his conclusions. We therefore translate some passages from his elaborate article, omitting the statistical portions, with which our readers are familiar from the publications of the American Iron and Steel Association—in this respect, as we have frequently had the pleasure to acknowledge, most complete and admirable. After a condensed *résumé* of the production, imports, exports and domestic consumption of pig-iron for the past five years, M. DÉBY remarks:

It appears that the mean consumption of pig-iron in the United States amounts to 2,675,116 tons annually—an amount which, compared with the possible product of the 713 blast-furnaces now existing (estimated at 5,439,230 tons annually) shows that the present capacity of production of pig-iron in the country exceeds the demand by 2,784,000 tons, or more than 50 per cent. This fact alone explains at once the rapid diminution of imports, and the lamentable depression of the pig-iron industry in the United States. It appears to us that the Americans have but four alternatives to which they may look for a change in the situation, and neither of these is encouraging: They must

1. Either put out of blast indefinitely a moiety of their blast-furnaces—which would involve the ruin of vast interests;

2. Or run their works but six months in the year—an unprofitable and impracticable plan;

3. Or manufacture products of such excellence as to command a sale abroad—a thing possible in some favored localities, and for certain qualities of cold-blast char coal iron only;

4. Or, finally, export 2½ million tons of pig-iron annually, by virtue of low prices—a notion which is evidently absurd in view of the present state of wages and freights, and which could only be realized in an uncertain and distant future, and after the promulgation on a grand scale of commercial liberty, which is now resisted by the great majority of American manufacturers with a blind zeal leaving little hope of an immediate solution.

What is clear for Europe is, that the American market for pig-iron is closed for the future; and that the day may come when American products of this class may be offered in our markets.

We may observe here that figures of "productive capacity" are almost always overrated. Even works continuously running do not equal their nominal capacity; and allowance should be made for this fact. But aside from this, M. DÉBY commits the error of giving us the choice of four alternatives only, forgetting a fifth important element, and forgetting also that all the five may be operative at once, each in a subordinate degree, and therefore without producing complete disaster such as he seems to anticipate. For instance, a portion of our blast furnaces, being unfavorably located or badly constructed, or old and worn-out, may remain out of blast. Another varying portion will always be temporarily out of blast, for various reasons. American car-wheel irons and a few other special brands may find and hold a profitable foreign market; and the same may come to pass gradually, even without Free Trade (which is what we suppose M. DÉBY means by "commercial liberty"), for the products of American furnaces favorably located as to inland and ocean transportation. Finally, the fifth element, which M. DÉBY has overlooked, will certainly come into play, namely, the revival of American industry generally, and of that progressive demand for iron which has been temporarily checked by commercial distress. M. DÉBY will notice that, in spite of the unexampled low condition of trade, the consumption was greater in 1875 than in 1871. If the ebb-tide now reaches the high-water mark of five years ago, it is fair to conclude that the returning wave will go still higher than the highest flood yet experienced.

As to the effect of the tariff on the question of foreign trade, we presume M. DÉBY would admit that the duty on iron is at present practically inoperative. The price of iron in this country is depressed by home-competition, and neither a higher nor a lower duty would give us a chance to make iron cheaper or to sell it more readily, here or abroad. If he means, as we suppose, that the abolition of all, or nearly all, duties, and the adoption of Free Trade in all commodities, would react upon prices and enable us to export cheap iron, we have only to say that he is quite right in supposing this measure to be a very "distant" possibility indeed. No American statesman, so far as we know—certainly no party of importance—is at present wasting time over a scheme so evidently impracticable, or, to say the least, premature. Even if M. DÉBY could prove it a benefit to the iron trade, there are numerous other important interests which might fairly object to being slaughtered for the sake of that one.

After demonstrating at some length the impossibility of profitable importations of pig iron by European manufacturers, M. DÉBY shows the same to be the case with Bessemer steel, and then proceeds to discuss the situation with respect to wrought-iron:

The well-established productive capacity of the United States for wrought-iron is 4,189,760 tons, while the consumption has never exceeded 1,140,000 tons, and was in 1875 but 1,116,831 tons. The excess of capacity is therefore equivalent to the enormous quantity of 3,072,922 tons, from which we may deduct perhaps the American exports, amounting to the ridiculous figure of 9,693 tons. The condition of American metallurgy, which we expose somewhat cruelly, with the figures before us, is certainly very grave, and merits the immediate attention of the economists of that country. The only possible safety appears to us to lie in exportation. But we repeat that Europe has nothing to fear from this quarter, while the tariff continues to force the ironmasters of the United States to pay excessive wages and freights, and excessive prices for part of their raw materials. The more the American tariff is raised, the more they are removed from the possibility of competition with us. * * * * * But we may ask the Americans to answer this question: What will you do with a surplus productive capacity of 2,764,000 tons of pig-iron and 3,000,000 tons of finished irons, when all the foreign markets are closed to you by reason of your high prices?

We have omitted a passage, in which M. DÉBY declares his expectation that Protectionists will accuse him of unworthy motives, and resent his advice. This anticipation may be realized in some quarters; but it is quite possible to differ with M. DÉBY courteously, and to recognize his sincerity, intelligence and good-will. We think his concluding question may be fairly answered as follows:

1. The alarming excess of capacity to which he refers is largely imaginary. For purposes of practical forecast concerning the future of the American iron trade, we think the amounts given may be safely reduced one-half.

2. When all deductions are made, however, there remains an undoubted excess; and it is certain that M. DÉBY's question strikes at the root of the trouble now affecting the iron manufacture of the country.

3. No change in the tariff will touch the case. We regard that matter, in the present state of affairs, as quite aside from our pressing difficulty or its possible remedy.

4. The prices of iron are, in our opinion, likely to remain for the present about where they are; and the result will be a struggle for life among the iron producing establishments, ending in the "survival of the fittest." New works are not likely to be erected, except where unusual natural advantages or facilities for transportation protect the enterprise. The general revival of industry and the growth of the country will bring back a normal and increasing home demand. Our competition in European markets will be chiefly in special qualities of iron which they need, and in articles of machinery or manufactures which involve invention and skill, as well as raw materials. If American inventors can secure justice abroad, the competition of ideas and designs will be

their best field. Then there will come a possible rivalry also in markets which are foreign to both Europe and the United States. Mexico, South America, and the East, will give us room for commerce; and the swift increase in the world's total consumption of iron per head of population promises to absorb our product, without ruining the business of other nations.

By the way, we shrewdly suspect that M. DÉBY's method, applied to other countries, would show an equally discouraging result. Let him compare the aggregate nominal capacity of English or even Belgian iron-works with the actual consumption of their products, and he will be led to conclude, we think, that the iron business throughout the world is just now overdone. In such a case, possibly, all nations, America included, may have to do one thing with their surplus "capacity"—keep it *potential* until the progress of the world requires it to be made *actual*. It is not necessary that all the iron ore on earth shall be mined, manufactured, and used up in the present generation. Besides all the markets now opened or closed to us, there is the market of posterity; and it is not inconceivable that the great natural resources and productive capacity of this country may have some relation to that market. *

NEW PUBLICATIONS.

A PRACTICAL TREATISE ON COAL MINING. By GEORGE G. ANDRÉ, F. G. S., Mining, Civil Engineer, etc. E. & F. N. SPON, London, and 446 Broome street, New York. Price, each part, $2.00. Complete.

THIS work, the first number of which we noticed in August last, has now reached its final part, and has in part sustained the favorable impression made on its first appearance. Of the great need for such a work in the English language there can be no question, and Mr. ANDRÉ has made a very creditable, and we think successful, attempt to fill the void. It may be well to note in this connection that since the appearance of Mr. ANDRÉ's work, a very excellent little hand-book on the "Principles of Mine Engineering," by J. H. COLLINS, London, has been published. As to previous publications, we only have JOHN HEADLY's and W. W. SMYTH's little books—both good—and that huge parody on mine engineering literature by GREENWELL, pompously entitled "A Practical Treatise on Mine Engineering," a book which is chiefly remarkable as an example of how very little information can be spun out into an enormous volume.

To briefly run over the main characteristics of Mr. ANDRÉ's work, we would remind our readers that it is divided into fifteen chapters, as follows:

I. Practical Geology.
II. Coal: Its Mode of Occurrence.
III. Searching for Coal.
IV. Shaft Sinking.
V. Driving of Holes or Narrow Work.
VI. Systems of Working.
VII. Getting the Coal.
VIII. Haulage.
IX. Winding.
X. Drainage.
XI. Ventilation.
XII. Incidental Operations.
XIII. Surface Work.
XIV. Management and Accounts.
XV. Characteristics of the Coal Fields of Great Britain and America.

The chapter on "Practical Geology" is inserted, we presume, in deference to the tradition that a book on coal-mining should begin with telling how coal came to exist, etc., etc., a tradition that is rapidly becoming obsolete,—for in this busy age, when a man wants a book on coal mining, or any other subject, he will take in preference one devoted exclusively to the subject in which he is interested, and to treat of all subjects in one great "Kosmos," would make each department very brief and imperfect, or else the whole work too large and expensive.

We noted, in a former review of the early numbers of this work, Mr. ANDRÉ's repeated statement, that anthracite coal is geologically older or lower than semi-bituminous coal, which is, in its turn, older than bituminous; and that gaseous coals "occupy the highest geological position, some of them occurring in formations more recent than those of the Carbon Period." And, again, that "the specific gravity increases with the age of the coal." And we pointed out that these statements are not at all confirmed in nature. As an example, we have before us samples of a soft post-carboniferous coal from New Mexico; beside it are samples of hard bright anthracite from the same bed, and also samples of what is, to all appearances, a graphite from the said district, and said to be from the same bed. The fact is, the different varieties of coal are found in beds of the same age; though, under similar circumstances, the older a coal is, the more progress it should have made toward anthracite.

We note, also, that Mr. ANDRÉ states, in a general way, that "anthracite is objectionable for steam purposes owing to its tendency to decrepitate while burning, and the close attention it requires on the part of the fireman." Mr. ANDRÉ should have limited his remarks to certain special anthracites, and have excepted those of Pennsylvania at least.

The second and third parts of the work are devoted to the necessarily very brief discussion of the properties of different kinds of coal, and to a clear and forcible description of the methods adopted in searching for coal—boring in particular being fully described; though the most important kind of boring, that with the diamond drill, receives but brief mention. The omission of figures of cost of diamond drill boring, except those charged by the Diamond Rock Boring Company, is to be regretted, as a comparison of them and those by percussion drills would have been of interest.

Part III. is mostly taken up with descriptions of tools used in mining.

Parts IV. and V. give an excellent review of rock drills, with sectional cuts of the Dubois-François, Burleigh, Kainotomon, McKean, Ingersoll, Darlington, and Worsop drills. We are surprised not to find any mention, even, of such excellent drills as the Waring, the Rand, the Wood, or the Union, and other famous rock drills. The omission is, at least, gross carelessness.

Mr. ANDRÉ makes a similar inexplicable omission to mention American compressors, while it is well known that this is *par excellence* the home of rock drills and air compressors, and that American machines of this class—such as the Burleigh, the Rand, the Waring, the Wood, the Ingersoll, and the Reynolds—are exported to Europe, South America, and nearly all other mining countries, where their superiority to the European, and especially the English, is universally admitted.

There is an excellent article upon explosives. This department appears to have been brought well up with the times, and the advantages of using the more powerful explosives and the effect of firing by detonation, instead of by simple ignition, in increasing the explosive force of all explosives, are clearly discussed. This part of the work is quite creditable.

All these details of machinery, explosives, etc., come under the general head of "Shaft Sinking," and form an introduction to a discussion of shaft-sinking proper which is admirable in its method of treating the subject and in its fidelity to detail. In fact it is easy, in reading this work, to pick out the departments in which the author seems to be personally familiar with the subject, and those which, being of collateral interest, he has had to introduce.

Parts VI. and VII. treat very fully and satisfactorily of the preliminary operations of "driving levels, or narrow work," and Part VIII. treats of getting the coal. In this the various systems are described and compared in a manner that shows considerable familiarity with practical mining operations. In the matter of mechanical coal-cutters, Mr. ANDRÉ does not appear to be a believer in these machines, or at least he thinks "the time has not yet arrived to speak decisively upon the subject" of their practical economy. He admits, however, a statement that one, the Winstanly & Baker machine (a disc machine), shows a notable economy over hand labor, and thinks the "Economic" machine (a revolving bar) gives promise of success. Both of these machines have been illustrated in this Journal. By a strange omission—such as we have already noted in connection with compressing and rock-drilling machines—no mention whatever is made of the Gartsherrie or our own American "Monitor" coal-cutters, both of which have been doing good service now for several years; and scarcely a mention is made of the Frith pick machine. There is scarcely any subject treated of in this work that has more interest than would a good impartial statement, supported by actual figures, of the comparative economy of machine and hand labor in coal cutting, and we had a right to expect such a discussion in this work. This is not, however, our only or greatest disappointment in perusing the latter part of Mr. ANDRÉ's book.

The first few numbers gave promise of great things, and received our cordial endorsement, as they deserved; indeed, the subject was well treated up to Part VIII. to near the close of the chapter on "getting of the coal." From this on the work disappoints us, and we venture to say is neither what the author had intended to make it, nor what he is capable of writing. If the whole work had been carried out on the plan originally proposed and partially executed, it would have required at least twenty, instead of twelve parts; and as it is an expensive work, the publishers doubtless limited the author to twelve parts, and spoiled what would otherwise have been, what was, and, we are sorry to say, what is still, a great need in the English language, viz, a thorough treatise on coal mining. It is not what Mr. ANDRÉ has written that we take exception to, but what he has not written. The fact is, the book was gotten up on too grand a scale—too much paper and too little matter; and while it is an admirable specimen of typographic art, and is very handsomely illustrated, it is not what is wanted to promote knowledge of the mining art among mine managers. At the same time, this book is infinitely superior to GREENWELL's huge cipher in mining literature.

The subject of "Haulage" is treated with some degree of satisfaction in Part IX.—the portion relating to mechanical underground haulage being mostly confined to extracts from the famous "tail rope committee's" report to the North of England Institute of Mining Engineers. "Winding," "Drainage," and "Ventilation," are disposed of in a summary manner, especially the latter important subject. "Lighting the Workings" gets but six pages; "Dams," only three pages; "Underground Fires," seven and a-half pages; and the whole subject of "Surface Works" is disposed of in two pages.

One of the most important subjects to be treated of in a book of this kind is "Management and Accounts," yet all we have upon it here is an extract from the General Rules prescribed by the Act of Parliament, and some Special Rules in force in the Lanarkshire District. Mine Surveying is not treated of at all; and a most impotent ending to a great promise consists in discussing the broad subject of the "characteristics of the coal-fields of Great Britain and America" in a chapter of seven pages, the American coal-fields being disposed of in the space of half a page!! Would it not have been better to have left out altogether several of these subjects, important though they be, than to invite ridicule by treating them in the manner we have noted?

We may sum up the matter about as follows: The first half of this work is very good indeed; much the best we have in the language on the subjects treated of. The last four parts are exceedingly defective, so much so as to spoil the good effect of the early parts. At the same time, owing to the wretched poverty of our literature on this important topic, the book will have a large sale, and must be read by all engineers who want to keep posted on the subject.

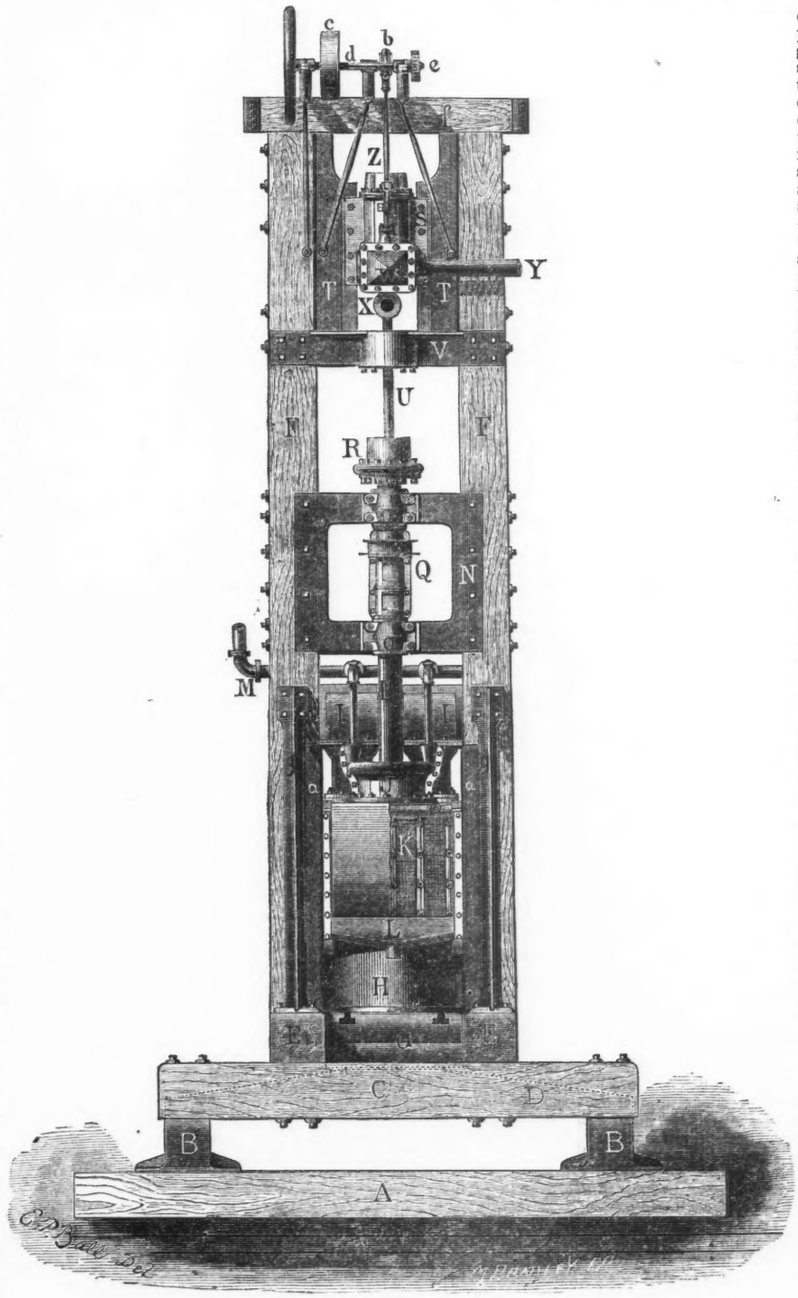
ORE CRUSHING MACHINERY AT THE PHILADELPHIA EXHIBITION.

Special Report of the Engineering and Mining Journal.

THE BALL STEAM STAMP.

THE use of steam in accelerating the velocity of stamp batteries has proved that where falling weights are equal, from three to four times the amount of rock can be pulverized with the steam stamps, when compared with the best drop or Cornish stamps. More than twenty years ago one of the Ball steam stamps was erected for crushing copper ore at the mines of the Copper Falls Mining Company, Michigan, and it has been successfully operated ever since. Many improvements have been made in the Ball stamps, so that their efficiency and durability are now considerably increased. The smallest stamp now made has a capacity of from 15 to 20 tons per day. One of these was in Annex No. 3 to Machinery Hall, where it was kept in operation for a short time every day.

The accompanying figure shows a front view of the stamp from the top of the permanent foundation upward. The upper course of this permanent foundation is composed of the timbers A A. The courses below this are made up of similar timbers, each row alternating in direction. Small spaces are left between the timbers which are filled with concrete. B B are two cast-iron sills, having broad bases and strengthened by knee braces which rest on the top of the foundation and support the whole of the upper part of the stamp. These sills are secured in position by bolts, which pass from them down through the bottom course of the foundation timbers. C C are two wooden sills on which rest the sills E E, which carry the two vertical posts F F, to which the principal part of the machinery is bolted. The bed plate G, and mortar H, are carried on the timbers G G, which are independent of the sills C C and E E, and which are elastic to a certain degree. Upon the centre of the bed plate G stands the mortar H, which is held in position by guides which work in the ways *a a*; these permit a vertical motion to the mortar when the timber D D springs back after each blow of the stamp. The lower portion of the mortar H is circular in form, the upper portion being oblong, with a flat top and vertical sides; on the front and back sides are inclined openings for receiving the screens. The mortar is cast in one piece, and is lined throughout with hard iron linings made of a mixture of gray iron and spiegeleisen. I I are two feed hoppers bolted to the top of the mortar and through which the ore is fed. J is a water urn through which water is admitted to the mortar. K K represent the screens which are secured in the inclined openings in the front and back sides of the mortar. L L are the discharge hoppers for the crushed ore and water. M is a pipe for conveying water to the mortar. N is an iron frame bolted to the posts having the two boxes O O, through which the stamp shaft P works. A revolving clamp and pulley Q, having feathers which work in splines in the shaft P, can be turned by a belt so as to give a rotary motion to the stamp, both during its ascent and descent. The stamp shaft P is round, and, in the small machine shown, is 4 inches in diameter, the largest stamp having one 8 inches in diameter. It is made of wrought iron, and is burnished all over; it works in the boxes O O, and passes downward through the urn J into the mortar. The lower end of the shaft is enlarged to form a head, to which the stamp shoe is keyed.



THE BALL STEAM STAMP.

The shoes are made of the same mixture of iron as is used in the linings to the mortar. They vary from 5 to 7½ inches in height, and instead of being made cylindrical, have two flat parallel sides. The width of these varies from 6½ to 10 inches, and the length from 14 to 22 inches. The dies are frustrums of cones, 7 inches high, and their upper surfaces are always a little larger than the largest diameter of the shoes. The upper end of the shaft has a circular flange to which the bonnet R is bolted. The steam cylinder S is bolted to the chock pieces JJ. The piston-rod *n* passes downward into the bonnet R, where a flange on the end of it is held between two rubber springs which prevent any shock to the cylinder when the the stamp strikes the ore in the battery. Another rubber spring in the buntee beam V arrests the upward motion of the piston-rod when too much steam is admitted into the cylinder; by this arrangement the danger of knocking out the upper cylinder-head is avoided.

An ordinary slide valve in W admits the steam to the cylinder. In order to produce a slow upward and quick downward movement to the stamp rod, the eccentric shaft *d* is moved by the intervention of two elliptical gear wheels, which move so that the cut-off on the up stroke is much quicker than on the down stroke. The cylinder is counter-bored, so that if the workmen neglect to feed the mill and allow the shoe to come too close to the die, the motion of the piston is arrested, and before it can be again started the piston-rod, stem and shoe have to be lifted up to their proper positions.

It will be seen from the figure that the valve is operated independently of the motion of the stamps necessitating a small amount of power from an auxiliary engine. Power from the same source is also necessary to turn the stamp shaft by means of the pulley Q. The diameter of the steam cylinder in the small machine shown is 6 inches and having an extreme stroke of 18 inches. Steam at a pressure of 70 pounds per square inch is sufficient to drive it 120 strokes per minute, the power necessary being about 8-horse, to crush from 15 to 20 tons of rock per day to coarse sand. The largest, or No. 1, size has a steam cylinder 12 inches in diameter and 28 inches extreme stroke. The stamp, shaft and shoe weigh 4,500 lb., and, when run at the rate of 90 strokes per minute will crush an average amount of 120 tons per day of 24 hours.

All the parts of the machine exhibited show careful workmanship in their construction, and where extraordinary wear is likely to take place special materials have been used to withstand it. The most important point of rendering the working parts as free as possible from the shock due to the concussion of the stamp has been provided for by placing the mortar on spring timbers, which are disconnected from the frame carrying the cylinder. The crystallization of the stamp-shaft, and the derangement or unequal wearing of the piston-rod and piston, from the same concussive action, are also avoided by the use of the cushioned connection between the stamp-shaft and the piston-rod, and also by the mechanical construction of the steam cylinder, which does not permit the stamp to remain in operation unless sufficient material is kept in the mortar to prevent any contact between the shoe and the tie. Except in one respect, the stamps are complete machines in themselves, the steam cylinder, which is a part of the machine, serving to do the work of stamping. The stamp is not, however, self-acting, a separate engine being necessary to work the valves and to rotate the stamp-shaft. This defect, which is only a defect inasmuch as it prevents the machine from being self-acting, is one which, in the works where they have been in use heretofore, is not a serious one, for in these, machinery adjacent to the stamps has supplied the small amount of motion necessary by means of belts. Where no such power exists for furnishing the necessary motion, a small auxiliary engine can be employed, the exhaust steam from the stamp being used to drive it.

The small space occupied by the machine, in proportion to the amount of work done, is a point very much in its favor. Two of the large size stamps, having a combined capacity of 240 tons a day, occupy a room only 20×40, while battens of drop stamps, having the same crushing capacity, need from two to three times as much room, and also require many more cubic feet of foundations. A very important consideration in the working of all stamps is that relating to the wear of the stamp shoes and dies. The practical use of t

Ball Stamp has demonstrated that in this respect they show a marked superiority over the ordinary drop-stamp when working upon similar ores.

Up to the present time these stamps have been almost exclusively used in the copper region of Lake Superior, for crushing the copper-bearing conglomerates which are found there. The machines have been constructed for the special purpose of working these ores, and are in that form hardly applicable to the working of gold and silver ores by amalgamation. This is a matter of detail, however, which can be readily modified so as to suit the conveniences of this class of work.

The successful application of these steam stamps to the crushing of ore in inaccessible localities will depend on several considerations. They should be managed by men who have some mechanical ability, as their parts, although not complicated, need more careful watching than do those of the ordinary stamp. In order to insure prompt repairs, when necessary, duplicate parts of the steam cylinder piston, piston-rods, valves, etc., will have to be kept on hand, or the facilities of a machine-shop, with skilled mechanics, must be available. The great crushing capacity of each machine requires that they should be in constant working order, as when stopped they correspond in loss of work to many sets of stamps, accidents to each of which only affect the running of a small portion of the whole. With regard to the comparative amounts of ore crushed per cord of wood, there is no data of a satisfactory nature which can determine this point, as the ores crushed at the Lake Superior mines are not pulverized as fine as in gold or silver patterns. As the experience with these mills has been mainly with those having a high crushing capacity, viz., from 100 to 120 tons of rock, per day, it is not yet known whether the smaller machines can crush at the same, or nearly the same, price per ton.

The following tabulated statement shows the cost of working these stamps at the Pewabic Mines, Lake Superior :

OPERATION OF PEWABIC (3 HEADS BALL'S) STAMPS, JAN. 1, TO DEC. 31, 1875.

1875.	OPERATION OF MILL.						RESULTS.			
	No. of Cords of Wood used.	Cost of Wood.	Cost of Supplies—Oil, Packing, Belting, etc.	Cost of Foundry Bills—Machinist Work.	Cost in Wages.	Total Running Expense.	No. of Days Running.	Tons Rock Stamped.	Tons Stamped per Cord of Wood.	Cost of Stamping and Washing 1 Ton of Rock.
		$	$	$	$	$				$
January	484	1,815 00	361 85	204 81	1,862 86	4,244 52	24	4,762	9·83	·89
February	477	1,788 75	278 00	141 73	1,445 13	3,653 51	21	4,355	9·	·84
March	510	1,912 50	306 31	181 57	1,716 38	4,116 76	22	4,638	9·	·88
April	380*	1,425 00	282 01	173 06	1,606 88	3,906 95	24	4,729	9·75	·82
May	425	1,593 75	275 99	194 30	1,772 56	3,836 60	24	5,028	11·80	·76
June	452	1,695 00	199 24	209 17	1,643 40	3,746 81	24½	5,033	11·13	·74
July	455	1,706 25	212 80	60 88	1,754 49	3,734 42	25	5,261	11·56	·71
August	485¼	1,819 69	175 12	138 36	1,695 99	3,829 16	24½	4,952	10·21	·77
September	428¾	1,605 93	263 55	144 65	1,596 03	3,610 16	24½	5,260	12·29	·68
October	404	1,313 00	514 12	148 58	1,632 66	3,608 36	24¼	5,062	12·53	·71
November	429	1,737 45	453 79	251 00	1,617 60	4,059 84	23	4,819	11·23	·84
December	403	1,632 15	449 30	173 57	1,606 16	3,861 18	21	5,043	12·51	·77
Totals and averages	5,332⅛	20,044 47	3,772 08	2,021 68	19,950 14	46,208 37	281¾	58,942	10·84	$·79

* In addition to 70 tons of coal, costing $420.

FIRES IN MINES: THEIR CAUSES, AND THE MEANS OF EXTINGUISHING THEM.*

By Richard P. Rothwell, Mining Engineer, New York.

(*Continued from page* 346.)

SPONTANEOUS COMBUSTION AND WEATHER WASTE OF COAL.†

Coal is a very complex substance, and though one with which we have long been very familiar, and which we make use of by oxidizing (burning), the subject of the exact conditions under which its oxidation takes place has received but little attention, and is, even yet, but imperfectly understood. We all know that at a high, but variable, temperature, the carbon of coal combines with the oxygen of the air, and forms carbonic oxide, or carbonic acid, as the case may be; but there are few who know at what temperature this absorption of oxygen commences, or what conditions facilitate it at a low temperature.

We are principally indebted to Professor E. RICHTERS, of the Mining School at Waldenburg, for our knowledge—so far as it goes—of this interesting and important subject. He has determined that at the ordinary temperature coal left in contact with oxygen, either pure or mixed with nitrogen, as in atmospheric air, absorbs oxygen, of which one portion combines with carbon and hydrogen, forming carbonic acid and water respectively, while another portion enters into an unknown state of combination with the coal, and proportionately increases its weight.

BERTHELOT‡ has succeeded in demonstrating the fact that coal can be hydrogenized also, at a temperature not exceeding 527° Fahr. In absorbing hydrogen, in the experiments of M. BERTHELOT, as much as two-thirds of the coal was converted into liquid hydrocarbons of the petroleum class.

On the other hand, we know that all coals, when freshly mined, give off a very noticeable amount of a hydrocarbon gas. In some mines, even in the hard anthracites of Pennsylvania, this escape of occluded gas is so energetic as to make a hissing or singing sound, that is easily recognized. This discharge of gas continues for a very considerable time, probably several weeks in some cases, after the coal is removed from the mine. In proof of this we have the record of a great number of explosions on vessels loaded with coal, and even with anthracite, days, and even weeks, after it was mined.

It has also been ascertained that all coal, or, at least, all bituminous coal, and, above all, those soft varieties that are rich in volatile matter and poor in fixed carbon, lose a large part of their volatile constituents by exposure to the action of the atmosphere, especially when the coal is in a finely comminuted state, and is exposed to a high temperature and moisture. The gas thus evolved varies, both in quantity and in composition, according to the nature of the different coals; it contains carbonic acid, oxygen, nitrogen, marsh gas, hydrid of ethyle (C_2H_2), gases absorbable by sulphuric acid, and sometimes a small amount of carbonic oxide. By far the most abundant of these gases is free nitrogen, and as this has never been certainly proved to result from any natural process of decay, it is, probably, derived from the atmosphere.

This view seems to be confirmed by RICHTERS' investigations on the weathering of coal, from which he concludes that more oxygen is absorbed from the atmosphere in weathering than suffices to oxidize that portion of the carbon which is evolved in the state of carbonic acid. A portion of the balance, probably, combines with the hydrogen to form water, and another portion enters into an unknown state of combination with the organic substance of the coal, and still another portion is consumed in oxidizing the iron pyrites which are almost always found in coal.

M. MARSILLY (see *l'Eclairage du gas* de R. d'HARCOURT) found that the long flaming coals, free from fire damp, of the Grand Hornu, Belgium, when heated to 350° Cent. (662° Fahr.), evolve nitrogen to the extent of 31·83 to 44·27 cubic inches per lb. of coal, and that 1 kilog. (2·2 lb.) of *fat, fiery, caking coal* at the temperatures indicated gave off the following quantities of gas :

Degrees Cent.	Degrees Fahr.	Litres.	Cubic inches.	Gas.
70 to 150	158 to 302	0·46	28·07	Uninflammable gas.
150 " 180	302 " 356	0·2	12·21	Gas yielding a blue flame.
180 " 250	356 " 482	0·9	54·93	" " a long illuminating flame.
250 " 300	482 " 572	0·51	31 12	" " a longer and brighter flame.
300 " 325	572 " 617	0·5	30·51	" " a still longer & brighter flame.
325 " 350	617 " 662	0·23	14·04	" " a very long & brilliant flame.

M. MARSILLY concludes that coals impregnated with fire-damp give off from 1 to 2 per cent. of uncombined hydrocarbons, below 626° Fahr., and the coal then completely loses its caking properties. These are the coals which deteriorate when exposed to the air in heaps.

The long flaming dry coals, at 572° Fahr., evolve but little nitrogen, a circumstance which distinguishes them from the fiery coals. Heated from 572 to 1014° Fahr., they do not give off gas, and are not much affected by exposure to the air.

Freshly-mined coal is acted on most energetically by the oxygen of the air; and though, according to RICHTERS, coal never entirely loses its power of absorbing oxygen, that power constantly diminishes by exposure to the air. According to the same authority, when coal is heated from 180° C. to 200° C., it at first gains in weight, more oxygen being absorbed than the weight of carbonic acid and water evolved; but on continuing this temperature, after a time both the weight and chemical composition of the coal will remain constant, and the relation in weight which then obtains between its hydrogen and oxygen is that in water, from which it is inferred that the oxygen which combines with the carbon is evolved again as carbonic acid, and that, consequently, with the disappearance of the disposable hydrogen, the permanent absorption of oxygen should cease. It has also been found that the quantity of oxygen absorbed by different coals, under the same conditions, is proportionate to the quantity of water they absorb, which last does not appear to depend on the physical structure of the coal, compact bright coals sometimes absorbing from two to three times as much water as very loose, soft, and tender schistose coals; but coal from the same seam over a wide area absorbed the same proportion of water. This characteristic may prove to be of such general application as to afford valuable assistance in the identification of coal beds where the measures are disturbed by faults, etc.

RICHTERS also found that coal absorbs three times as much carbonic acid as oxygen in a given time, and under the same conditions; and even coal that has been weathered till it will scarcely take up any oxygen will quickly absorb its own volume of carbonic acid.

Numerous experiments seem to prove that sunlight always lessens or retards the absorption of oxygen by coal; a fact that may, in part, explain the generally admitted phenomenon of coal or wood not burning so well in the sunlight as in the shade.

That some coals are capable of spontaneous ignition when allowed to accumulate in the form of dust or slack, and sometimes when subjected to heavy pressure in the pillars of coal mines, is a well-known fact; but to what this property is due has always been an open question, though it has usually been attributed to the decomposition of iron pyrites in the coal and shales accompanying the coal. The atmospheric oxidation of iron pyrites, by which the sulphurets are changed into sulphates, is a comparatively slow process; and, though undoubtedly capable of developing a large amount of heat in a confined area, it does not account for the majority of well-substantiated instances of spontaneous ignition of coal, both in the mines, on board ship, and in stock yards. RICHTERS has shown conclusively that the coals most liable to spontaneous ignition are not those which contain the largest percentage of iron pyrites, but that this property is principally due to the atmospheric oxidation of the organic substance of the coal. The following table gives his classification of eleven varieties of coal, according to the degree of their self-inflammability :

TABLE OF COALS ARRANGED ACCORDING TO DEGREE OF SELF-INFLAMMABILITY.

Degree of Self-Inflammability.		Iron Pyrites per cent.	Water per cent.	Character of the Coal.
CLASS I—Difficultly Self-inflammable	1	1·13	2·54	Easily friable.
	2	1·01 to 3·04	2·75	Very compact.
	3	1·51	3·90	" "
CLASS II—Of Medium Self-inflammability	4	1·20	4·50	Firm, schistose, bright.
	5	1·08	4·55	Hard, but very brittle.
	6	1·15	4·75	Moderately tender.
	7	1·12	4·85	Outwardly very like No. I.
	8	1·00	9·01	Moderately tender, schistose.
CLASS III—Readily Self-inflammable	9	0·83	5·30	Moderately soft, schistose.
	10	1·35	4·85	" " "
	11	0·84	5·52	Not stated. Yielded only 2·5 per cent. of ash. From the same pit as No. 10, but from a different seam, remarkable for its great self-inflammability.

From the above-mentioned facts, which express the results of the latest and

* A paper read before the American Institute of Mining Engineers, at the Washington Meeting, February, 1876.

†Many of the data relating to this subject will be found in the last edition of PERCY'S *Metallurgy*, 1875.

‡ *Ann. Chim. Phys.* 1870, and *Bulletin, Soc. Chim.*

most reliable observations and direct experiments—somewhat contradictory as some of them seem to be—we may deduce many valuable practical lessons.

Many varieties of coal deteriorate to a great extent when exposed to the air, and this deterioration is greatly favored by high temperature, and, in coals which contain sulphurets of iron, by moisture; in coals free from iron pyrites, this oxidation seems to be even more energetic when dry than when wet. It is always greatly increased in all kinds of coal by increase of temperature, and is more energetic when the coal is in dust or slack.

This deterioration of coal has been aptly termed "weather waste." It is, as we have seen, not dependent solely on the physical character of the coal, though the harder the coal the less it is injured; and in some cases that have come to our own knowledge, an exposure of eight or ten years of certain Lehigh anthracites had not affected the quality to any extent that could be appreciated in its subsequent use in blast furnaces. In the case of coking and gas coals, however, the depreciation in the heating power, and in the coking and gas producing properties is very great; indeed, a very moderate exposure to the air, in heaps, at a high temperature and when moist (for these coals, for the most part, contain more or less iron pyrites) frequently entirely unfits them for use. A recent example suggests itself, in which a large amount—several thousand tons—of Albertite (a rich gas-producing mineral quite free from sulphur) was piled on a dock in Boston. So rapid was the absorption of oxygen by this so-called coal that it heated and actually fused, running together round the edges of the pile, and finally even igniting. Its value as a gas coal was almost entirely destroyed.

The spontaneous ignition of coal is, doubtless, greatly facilitated by, though not altogether due to, the presence of iron pyrites; for the oxidation of the iron pyrites is attended with a considerable development of heat, and by swelling, it splits up the coal, and renders it more pervious to oxygen. The real cause of spontaneous ignition is probably the oxidation of the organic substance of the coal; it is, in fact, a very energetic example of weather waste, and the precautions to take in each case are the same.

In mines the crushing of the pillars where they are left too small, or when from the oxidation of the coal and pyrites in the coal, they gradually "spall" off, causes an accumulation of fine coal around the pillars; this and the fine coal thrown back into the "gob" along with the shales (which contain most of the iron pyrites) and other rubbish, form exceedingly favorable conditions for spontaneous combustion. There is usually enough oxygen in the air of the goaves to support this slow combustion, while the velocity of the air current is not sufficient to carry off the heat, and thus prevent the weather waste from developing into spontaneous ignition of the coal.

Spontaneous combustion is by no means confined to coal, but pieces of wood imbedded in the coal dirt, rags or cotton waste saturated with vegetable or animal oils are subject to it—in fact this is the cause of a great number of fires on the surface as well as in mines.

As an instance of the facility with which cotton, saturated with oil, will ignite, we may mention a curious case that came under our observation some years ago. Two or three men were severely burned by an explosion of a powder-mill at Wilkes-Barre, Pa., and the remedy applied by the kind-hearted neighbors was to envelop the patient in cotton padding, saturated with linseed oil. They were greatly astonished to find that the heat of the body, after a time, ignited the cotton and oil, and the victim of well-meaning ignorance was with difficulty saved from cremation.

Many of the unaccountable fires in the mines, both in anthracite and bituminous coal, are undoubtedly due to spontaneous combustion, either of the coal itself, as in the case of some of the bituminous coals, or, more frequently, from the more energetic spontaneous combustion of oiled "waste" or other easily inflammable substance. The fire that has now been burning for some four years in the No. 6 Tunnel Panther Creek Mines (Lehigh Coal and Navigation Company) is supposed to have been caused by spontaneous combustion, originating in the gob or rubbish in some abandoned works where the ventilation was very slack. It is exceedingly doubtful if our hard Pennsylvania anthracites will ignite spontaneously, even when they contain considerable quantities of iron pyrites; but it is an incontestable fact that piles of culm, or coal dirt, on the surface, or in many parts of the anthracite regions, have ignited spontaneously. We attribute the ignition to the presence of the more inflammable rags or cotton waste saturated with oil, or simply to oil saturating the fine coal, as we can readily conceive may occur in almost every pile of coal dirt about a colliery. Many of you have, doubtless, frequently noticed the heating of culm banks, but it is rarely that one actually iguites, which tends to prove that the anthracite coal itself, even in the form of dust, will not ignite spontaneously, but that the accidental presence of a more inflammable substance may readily cause a fire.

As already stated, the danger from spontaneous combustion of the coal in mines may be overcome either by a ventilation so active as to keep the temperature of all parts of the mine so low as to prevent ignition of the coal, or it may be prevented by an almost opposite course, viz., by cutting off altogether the ventilation of abandoned workings, so that from the absence of oxygen no combustion can take place. In mines where the coal is subject to spontaneous combustion, both plans are adopted, with more or less success. If it were possible to keep the abandoned works always open, to prevent falls or crushing of pillars or accumulations of fine coal in places where but little air can reach it, probably thorough ventilation would insure safety; but as these conditions cannot be secured, it has been found safer to prevent altogether the access of air to the parts of the mine where conditions favorable to spontaneous combustion exist. The method of walling off the goaves or old workings is objectionable in many respects. If the mine produces fire-damp, the walling off merely creates a magazine of a most dangerous explosive gas in the mine. If a fall of roof occur in the old workings, it may force this gas out into the working parts of the mine, and cause explosions; or in many ways a small but sufficient quantity of air may be admitted to the walled-off space to sustain, in the most effective manner, the slow combustion which it is desired to prevent. In the south of France, where the beds are very large, and the coal subject to spontaneous ignition, the system of mining known as by "remblais," in which the space from which the coal is taken is filled by waste material, and the roof is allowed to settle down on this packing, has been found to be the only really effective preventive of fires from this cause. The packing effectually excludes air, and consequently no combustion can take place. No other system of mining than that of taking out all the coal, and either allowing the roof to fall as the work proceeds, or of filling the space from which the coal has been taken, is adapted to working in coals of this character. In chamber and pillar work, the crushing of the pillars, which cannot be prevented, is a constant source of danger, for it presents the most favorable condition possible for the spontaneous ignition of the coal.

Soot from anthracite coal, or indeed from any kind of coal, is less inflammable than ordinary lamp-black, which ignites with such facility that even a few drops of oil or other easily oxidized substance in it is liable to cause its ignition by the rapidity with which it absorbs oxygen, as several fires in lamp-black factories in different parts of the country have proved. It is well known also that powdered charcoal will absorb oxygen so quickly as to ignite spontaneously. Is it possible, therefore, to over-estimate the danger of using chambers in the coal as flues for underground furnaces? If it be necessary, which is rarely, if ever, the case, to have boiler or ventilating furnaces in a coal mine, it is no more than ordinary prudence to line the flues with brick throughout, and take even greater precautions than would be taken in houses on the surface.

TO BE CONTINUED.

NOTES ON THE METHOD OF PREPARATION OF ZINC OXIDE.

By Charles P. Williams, Ph. D., Rolla, Missouri.

THE successful production of zinc white or oxide on a commercial scale in this country, dates from the issue of the patent of SAMUEL WETHERILL, for the preparation of the material (November, 1855), and from the earlier patent of SAMUEL T. JONES, for the mode of collection. In WETHERILL'S method the furnace is an arched chamber, of rectangular horizontal section, the sole of which is composed of perforated grate bars. The closed space or chamber beneath the sole is supplied, by a fan blower, with the air requisite for the combustion. The arched roof is pierced with two openings, the one connecting with the stack, the other communicating with the collecting apparatus. At different stages of the operation the one or the other of these openings is kept closed.

The furnace is operated by spreading over the grate bars a layer of anthracite coal (commonly of the size of either "pea" or "nut" coal), which, after thorough ignition, is covered with a stratum of mixed crushed ore and anthracite dust, in the proportion of two parts by weight of the former to one of the latter. The usual charge is about 600 pounds of the mixture indicated; the weight of the bedding coal is from 250 to 300 pounds. The charge is elaborated in about six hours time.

In this furnace, under the conditions indicated, there is a rapid reduction of the zinc oxide of the ore to vapor, and an almost simultaneous reconversion of the metallic vapor into oxide. This reduction and oxidation of the zinc, taking place *pari passu*, as it were, in the same furnace chamber, constitutes one of the interesting features of the method, which WETHERILL notes, in describing his furnace, as "a compound reducing and oxidizing furnace."

The residue withdrawn from the grate bars after the elaboration of a charge, consists, beside some oxide of zinc, of the ashes of the reducing and bed coals, unconsumed coal and the non-volatile matters of the ore, and is entirely scoriaceous in character. Its weight is about equal to the weight of the ore in the charge, or, say about four hundred pounds. When the furnace has been properly charged and worked, the amount of zinc oxide remaining in the residue ranges between 2¼ and 4½ per cent. of the weight, with probably about 3 per cent. as the average contents of normal residue.

Experience with these furnaces has shown that increase in amount of zinc oxide in the residue invariably follows increase in thickness of the charge, and that no lengthening of the time of treatment will serve to remove this oxide. In the annexed table (which is condensed from the testimony in WETHERILL *et al. versus* the N. J. Zinc Company—U. S. Circuit Court, District of New Jersey, 1871) there are collected some analytical results bearing on this point:

No.	Depth on Sole. [inches.]	Time of work. [hours.]	Zinc Oxide in Residue. [per cent.]	Analyst.	Remarks.
I.	5 to 7	6	(under) 4	ROEPPER.	Average at "Lehigh Works."
II.	5 to 7	6	2·5 to 4	.....	" " " "New Jersey."
III.	6 to 8	5	2·03	GARRETT.	New Jersey—Regular.
IV.	6 to 8	6	1·20	WILLIAMS.	" " "
V.	14 to 17	13½	8·05	ROEPPER.	" " Experiment.
VI.	16 to 19	28	10·45	WILLIAMS.	" " "
VII.	16 to 19	28	13·05	ROEPPER.	" " "
VIII.	16	28	10·23	WILLIAMS.	N.J. exp. with alternate layers coal and charge.
IX.	10 to 11	14	9·75	ROEPPER.	New Jersey—Experiment.
			10·54	WILLIAMS.	
			8·06	GARRETT.	

It would seem from these results that the best returns of oxide are obtained with a depth of about six inches, measured from the grate bars, and including therefore the thickness of the bed coal layer. Much less thickness than this is not practically attainable without a decrease in the duty of the furnace, which would scarcely be compensated for by the slight gain in oxide from a cleaner residue, it probably being more economical to allow a wastage of oxide to the amount given than to decrease the production of the establishment by lessening the weight of ore treated.

As the depth above the sole is increased, the wastage of zinc oxide becomes greater, till, as shown above, with a thickness of somewhat more than sixteen inches, a working period of twenty-eight hours gave a residue with 13 per cent. oxide. Alternating layers of the bed coal with the mixed ore and coal gave no noteworthy decrease in the amount of zinc oxide left in the residue.

If the relations of zinc to carbonic acid at certain elevated temperatures be considered, these results, as well as the peculiarities of the furnace, are readily explained. Such relations impress on zinc metallurgy peculiar features; for besides provisions for the reduction and volatilization of the metal, they necessitate such peculiarities in the condensation that the receiver must be much smaller than the retort (in practice about the proportion of one of receiver to sixteen of the retort) in order to lessen loss by reconversion of zinc vapor into zinc oxide.

In the manufacture of zinc oxide, where reconversion to the fullest extent is desired, the upper part of the furnace above the charge takes the place of the receiver and is, therefore, larger than the distilling apparatus or space occupied by the charge. It is admitted that the oxidizing agent is carbonic acid, for, from the conditions of the working, atmospheric oxygen must be almost entirely wanting; besides, oxidation effected by oxygen admitted above the

* A paper read before the American Institute of Mining Engineers, at the Philadelphia meeting, October, 1876.

charge is only partial, giving "blue powder"—a mixture of zinc metal and oxygen. Carbonic oxide must be the effective reducing agent, for the mixture of ore and coal is hardly intimate enough for solid carbon to have much effect in deoxidizing the oxide of zinc of the ore. Under such conditions the series of reactions in the furnace may be taken to be somewhat as under:

1. Production of carbonic acid by combustion of bed coal.
2. Reduction of carbonic acid to carbonic oxide by carbon of the charge.
3. Reoxidation of carbonic oxide into carbonic acid by the oxygen of the zinc oxide of the ore, and volatilization of the zinc vapor at the temperature of these charges.
4. Zinc vapor + carbonic acid at the surface of the charge = zinc oxide + carbonic oxide, as final products.

With depth of charge increased above a certain limit, it can be understood that the temperature in the upper part of the bed would not be sufficiently high for number 3 of the series to be brought about, or even for the final charge. Thickening of the bed coal might cause reaction No. 2 to take place by the carbon of the fuel, with reduction of calorific power before reaching the charge.

If these are the changes in the furnace used for zinc white production, they do not differ in kind from those in spelter manufacture. In the former, however, reoxidation is courted, while it is reduced as much as possible in the treatment for metal.

If the ores contain sulphides in admixture, zinc sulphate is always found in the "oxide." The presence of galenite in the ore gives lead sulphate in the product. The ore of Sinking Valley, Pennsylvania, treated at the Keystone Works, contained, commonly, 6 to 8 per cent. galenite, and gave an oxide with 25·084 per cent. lead sulphate, 73·246 zinc oxide, and 0·574 zinc sulphate. The so-called Bartlett White Lead, formerly prepared from the buddles of the Washington Mine (N. C.), with about the same amount of galenite, had 72·083 per cent. zinc oxide, 23·968 of lead sulphate, and 0·810 zinc sulphate.* It is probable that some of the lead sulphate is carried forward by the light zinc oxide; possibly, however, there may be a volatilization of metallic lead and a subsequent union with sulphuric acid and oxygen at reduced temperature. The latter action must come into play where nearly pure galenite is burned (into lead sulphate, mainly) as a substitute for white lead.

At Hopewell, Washington County, Missouri, the manufacture of oxide was attempted, at first by the use of charcoal, both for fuel and for reducing, but the color of the oxide was found to be impaired, so that change was made to anthracite. The latter was not abundant or cheap, while the ores were of high grade and relatively low in price. Probably with a view to adapting the manufacture to the economical surroundings, the charges of the furnaces were made somewhat heavier, the time of working was shortened, and less bed coal was used. These changes resulted in the production of "oxide" of good quality, though the resulting residue was rich in zinc. How far, if at all, this wastage was instrumental in the suspension of the work at the furnaces, I am not prepared to say.

There are eight of these furnaces at the works named, each with a horizontal section of 6 by 4½ feet, and with a space of 27 inches height above the grate bars. The ore came usually from the lead deposits of the neighborhood, which may be considered a representative sample, showing the following composition:

	Per cent.		Per cent.
Zn O	53·997	Sb O_3	0·170
$Fe_2 O_3$	4·263	Ph O	trace.
$Al_2 O_3$	0·632	CO 2	24·302
Fe O	1·039	Si O_2	8·510
Ca O	2·393	S	0·242
Mg O	0·546	H_2 O	2 414
Cu O	0·052		
Cd O	0·173		99·743

The bed coal was about 35 per cent. of the weight of the charge. The time of working was about four hours. The residue contained 25·426 per cent. zinc oxide; 12·528 ferrous oxide; 31·74 silica; 10·04 unconsumed carbon, besides alumina, lime, magnesia, sulphur and copper. The following are the percentages of the foreign matters in the four grades of oxide produced at this establishment:

	"Star I."	"Star II."	"Star III."	"Oxide."
Zinc sulphate	1.153	0.203	1·001	0·824
Lime "	0·008	0·041	0·080	0·011
Lead "	4·790	3·243	1·271	0·249
Lead oxide	1 047	4·598	3·399	0·814
Copper oxide	0·063	0 186	0·043	0 021
Ferric oxide	trace.	trace.	trace.	trace.

CONVERSAZIONE OF THE AMERICAN INSTITUTE OF MINING ENGINEERS.

On Faults, Upheavals and Erosion—The Post-Carboniferous Coal Fields of the West.

REMARKS BY MAJOR POWELL.

Throughout the Rocky Mountain region there are many conspicuous topographical features found on the flanks of great ranges and elsewhere, known as monoclinal ridges. Such a ridge is composed of beds dipping in one direction. On the face of the ridge the escarped edges of the bed are seen. On the back of the ridge the highest geological bed is found, and often the slope of the back conforms more or less to the dip of the beds. Where the dip is great, the higher beds are beveled towards the summit of the ridge; where the dip is small, the higher beds are cut through at the foot of the slope, so that lower beds are revealed, especially in the gulches.

In any region where the beds involved are stratified, and displacement is by flexure, and upheaval is faster than atmospheric degradation, monoclinal ridges appear; such ridges being composed of harder beds, while the valley spaces are excavated in more friable material. Manifestly, all such ridges must face the axis of upheaval. In some symmetrical anticlinals, the series of ridges appearing on one flank are also seen on the other.

Here the genesis of such ridges, both in anticlinal and monoclinal flexures, was explained, and the following law was stated: As upheaval progresses *pari passu* with degradation, monoclinal ridges recede from the axis of upheaval with the increase in the amplitude of the flexure, and new ridges may appear near the axial region.

Major POWELL then explained the effect of faults in giving position to the ridges. He first considered the effect of a fault at right angles to the axis of upheaval, and hence at right angles to the monoclinal ridge. In such a case upheaval is arrested on one side of the fault, but continues on the other both in anticlinal and monoclinal flexures. In the arrested portion the ridges cease to recede from the axis of upheaval, while in the other portion, where upheaval goes on, the ridges continue to recede. By the fracture the ridge is broken; and by the recession of one part and non-recession of the other the ridge is faulted in such a manner as to give it the appearance of a "lateral displacement," and such phenomena have thus been erroneously explained.

The following law was stated: Where a monoclinal ridge is broken and one portion carried farther back from the axis of upheaval than the other, the faulting is by vertical upheaval though the ridges appear to be horizontally displaced.

Major POWELL next explained the effect of a fault oblique to the axis of upheaval and the effect of two oblique faults crossing each other, in all cases illustrating from examples in nature. Then he further explained how a ridge that was simple topographically might be compound geologically, being composed in different parts of beds of different geological horizons.

In the examples considered the changes in monoclinal ridges were produced by faults transverse or oblique to the dip of the beds or the axis of upheaval. Another series of changes are produced by faults parallel, or nearly so, to the axis of upheaval. On either flank of an anticlinal or in a monoclinal there is a belt of dipping rocks which may be denominated as the zone of flexure. It is often observed in nature that displacement proceeds as flexure along such a zone for a time, and subsequently displacement by flexure ceases but is continued by faulting, so that a plane of fracture is found to run along a zone of flexure. If the plane of fracture is on the side of the zone of flexure nearer the axis of upheaval, the ridges composed of beds of the lower geological horizon are lost; if the plane of fracture is on the side of zone of flexure farthest from the axis of upheaval, the ridges composed of the beds of the higher geological horizon disappear; if the plane of fracture is midway in the zone of flexure, the middle ridges disappear.

Often the plane of fracture meanders through the zone of flexure when the ridges are more or less curved and broken, and ridges that are simple geographically are often compound geologically.

All the monoclinal ridges thus far described are MONOCLINAL RIDGES OF UNEQUAL DEGRADATION as distinguished from MONOCLINAL RIDGES OF DISPLACEMENT. The latter have a very different genesis from the former. A long fracture is produced in the sedimentary beds involved, and on one side of this line the beds are upheaved—tilted up—so as to produce a ridge with the beds all dipping in one direction. Often such upheavals are of great magnitude, producing important ranges. Such a ridge is produced directly by upheaval, and all ensuing degradation serves but to obscure the ridge-like character of the mass. Many of the ranges of the Desert system and Basin system are of this character.

The whole subject was illustrated by drawings on the blackboard.

From the facts presented, the following deductions were drawn:

I. Displacement by flexure is very slow, and, where it appears as upheaval in relation to the level of the sea, is little faster than atmospheric degradation.

II. Displacement by faulting is very slow, and, where it appears as upheaval, it is but little faster than atmospheric degradation, but such faulting may be paroxysmal and intermittent.

III. Faults discovered by the position of monoclinal ridges have been erroneously explained as "lateral faults." The position of the ridges is, in fact, due to vertical faults, by which two parts of the same flexure are differentiated, the region having the greatest amplitude of flexure having its monoclinal ridges curved farther back from the axis of upheaval.

IV. If the rate of upheaval is greatly accelerated, the rate of degradation is greatly accelerated. If in two parts of an anticlinal upheaval the one has an upheaval exhibiting 10,000 feet, the other 20,000 feet, the later, *ceteris paribus*, will have a general surface but slightly elevated above the former. In other words, the rate of degradation is chiefly determined by the rate of displacement.

In that branch of Mining Engineering which has to do with determining the position of beds of coal, these facts are of prime importance; this is especially true throughout the Rocky Mountain region.

Major POWELL then referred to the map of the United States, and gave a geographical description of the principal coal areas so far discovered in the United States west of the 100th meridian. All these coals are lignitic, with a geological horizon quite through the cretaceous and high into the tertiary. Very few of the beds are of great geographical extent, and many of them have a very limited extent laterally. On the other hand many of them have great thickness, and the number of individual beds is very great, so that altogether the regions indicated have an abundance of lignitic coal, which for some purposes is of considerable value.

The limited area of the beds usually renders it impracticable to sink for coal in horizontal, or nearly horizontal, strata on general evidences of stratigraphy, so that exploration for coal is chiefly confined to the tracing of beds in upturned strata.

The general coal horizon varies from one to ten thousand feet. The rocks are chiefly sandstones and shales, rarely fossiliferous, and the tracing of beds must depend very largely on lithologic characteristics. The harder beds, or those which have ridges, are the rocks to be traced; the relation of any bed of coal, which it is desired to follow, to such rock, being known. The tracing of coal beds, therefore, is resolved, for the greater part, into the tracing of monoclinal ridges. This is almost universally true throughout the whole Rocky Mountain region. Other conditions prevail in the Valley of the Mississippi, but the facts stated in the first part of these remarks will, doubtless, be of value in the Appalachian region.

Throughout the Rocky Mountain region a great number of coal enterprises have been disastrous, by reason of the failure to recognize these facts. In a single district in Utah, namely, at Coalville, where the inclined beds are greatly faulted, many thousands of dollars have been wasted in the erection of works and the building of railroads to fragments of beds in the inclined ridges, which were soon exhausted, and the miners were not able to determine in which direction to search for the missing beds.

Similar conditions have been met with on the eastern slope of the Park Mountains, in Colorado, and in many of the coal districts on the Union Pacific Railroad.

* The full analyses of these and other similar products, by the writer, can be found in 2d Supplement to Watt's Dictionary of Chemistry, page 725.

COLORADOITE.—*The New Telluride of Mercury.*—Dr. THEO. BERDELL has recently received from Prof. F. A. GENTH, of the University of Pennsylania, the result of the analysis of a sample of ore sent from the Mountain Lion lode, Magnolia district, in this county. It proved to be a telluride of mercury, and Prof. GENTH has named it Coloradoite, in honor of the State of Colorado. This ore is not common in the mine, but quite a number of samples have been obtained, one of which, a part of that analyzed, Dr. BERDELL has now in his possession—*Boulder News.*

THE MINERAL WEALTH OF JAPAN.*

By Henry S. Munroe, E.M.

THE earliest accounts we have of Japan represent the country as having great mineral wealth, especially of precious and useful metals. MARCO POLO, the Venetian traveler, in the thirteenth century writes of "Zipangu": "They have gold in greatest abundance, its sources being inexhaustible. The king does not allow of its being exported. To this circumstance we are to attribute the extraordinary richness of the sovereign's palace. The entire roof is covered with a plating of gold. * * * The ceilings of the halls are of the same precious metal; many of the apartments have tables of pure gold of considerable thickness, and the windows also have golden ornaments." MARCO POLO also gives an account of an unsuccessful Tartar expedition against Japan, prompted by the supposed great wealth of the country.

COLUMBUS, as well as many other explorers, were attracted and encouraged by the prevalent reports of the wealth of the same islands of Zipangu.

KAEMPFER, writing in 1727, also speaks of the great mineral wealth of Japan, and especially of the abundance of gold, which, he says, is found in many provinces.

The Portuguese and Dutch, while they had trading posts in Japan, furnished tangible evidence of the truth of the early reports. Between 1550 and 1639 the Portuguese merchants sent home from Japan nearly three hundred million dollars' worth of bullion, most of which was gold. As the relative value of equal weights of gold and silver was then six to one, while in Europe, at the same time, it was nearly twelve to one, the exchange of silver bullion for gold was by no means an unimportant part of their business. After the Portuguese, the Dutch continued the exportation of bullion, and the exchange of silver for gold, though with less profit, as the relative value of gold increased with the demand. Between 1649 and 1671 the Dutch traders sent home over two hundred million dollars in bullion, of which, however, nearly two-thirds was silver.

In 1671 the Japanese Government, alarmed at the rapid rate at which the precious metals were leaving the country, issued an edict forbidding the exportation of gold or silver, under heavy penalties, which had the immediate effect of stopping this trade.

Besides bullion, copper formed at this time a most important article of export. According to Dr. GEERTS,† who has examined the old books of the Dutch factory in Nagasaki, between 1609 and 1858 about 280,000 tons (of 2,000 lb.) were exported by the Dutch, and during the same period over 250,000 tons by Chinese merchants.

According to Japanese historians, the arts of mining and metallurgy were introduced from China, probably through Corea, toward the close of the seventh century. The following dates are given on the authority of Dr. GEERTS, but some at least are open to doubt:

667 A.D.—Silver first discovered in Japan.
674 A.D.—Silver smelting works established.
‡684 A.D.—Copper first discovered in Japan.
‡706 A.D.—Copper coins first made.
749 A.D.—Gold first discovered in Japan.

Long before this time, however, the arts of mining and metallurgy must have reached a high state of development; for copper swords and spear-heads, copper tools of various kinds, and specimens of a very peculiar form of copper bell, are frequently found buried in the earth. If the statements of Japanese antiquarians concerning these articles be accepted, they must certainly be regarded as very ancient, possibly belonging to a pre-historic age of copper, but certainly antedating the years given above by many centuries. I have in my possession a large copper bell of this kind, which I hope to exhibit to the Institute at some future time.

But to return to historic times. Until the advent of foreigners the processes in use were very rude, and the production of metals very small. The history of Japanese metallurgy really dates from about the year 1600 A.D., when copper was first smelted on a large scale. The production of gold, probably from easily-worked placer deposits, reached its maximum earlier, during the latter half of the sixteenth century; while silver, requiring greater metallurgical skill, was produced in largest quantity about the middle of the seventeenth century.

Owing to various causes, which will be fully discussed hereafter, the production of precious metals has gradually fallen off, so that the present annual yield is comparatively small. The amount of copper now produced is about the same as the average of former years, showing little increase or decrease.

KAEMPFER, in 1727, enumerates, in addition to gold, silver, and copper, the following as the mineral products of Japan: viz., sulphur, iron, tin, coal, salt, agates, jasper, and naphtha. This list, with few additions, is nearly the same as we would give to-day. With respect to the production or exportation of these minerals in former times, we have no reliable information, but the amounts produced or exported must have been insignificant.

Past history, though making a very creditable showing of wealth, does not warrant the prevalent belief in the extraordinary mineral riches of the Japanese Islands, unless we suppose that the greater part of these riches are as yet undiscovered, and that more thorough exploration will greatly increase the number of valuable mines. This is the general belief both of Japanese and foreigners. The large amounts of gold, silver, and copper exported from Japan in past years are thought to be only a tithe of the possible yield under more advantageous circumstances. Japan is even now looked upon as an "El Dorado," waiting the advent of a more energetic people to yield her enormous riches. To-day foreign capitalists are anxiously awaiting the time when Japanese mines shall be opened to them, and are impatient of the restrictions of the Government, which prevent them from developing the great resources of the country to their profit.

The Japanese, however, are very close observers of nature, and make good prospectors, and in the centuries since their attention was first turned to mineral deposits, they have left little or no ground unexplored; while in the mining districts every hill is riddled with tunnels and adits.

It seems probable that the gold, silver and copper of previous years have been derived from a large number of poor deposits, worked by very cheap labor; and most of these old mines cannot now be worked, owing to the increasing value of labor, and to a real and practical exhaustion of most of the deposits. Improved methods of mining are much needed, and will undoubtedly, if successfully introduced, increase largely the product of the mines.

* A paper read before the American Institute of Mining Engineers, at the Philadelphia meeting, June, 1876.

† Transactions Asiatic Society of Japan, vol. iii., p. 41.

‡ Official Catalogue, Japanese Section, Philadelphia Exhibition, p. 49. According to Dr. GEERTS, 698 A.D., and 708 A.D.

Within the last few years the Japanese Government has done much to encourage mining industry, and to determine the real value of the mineal deposits of the country. Foreign engineers and scientific men have been permitted to travel through the country, even when all others were excluded. The island of Yesso has been made the subject of several geological surveys and reconnaisances. Foreign mining engineers have been employed by the Government and by private enterprise to examine and report upon mines and mineral lands in other parts of the country. The Government has also established a "Mining Office" under the direction of competent foreign engineers, having charge of the Government mines, many of which are now worked by the most approved foreign methods, with foreign machinery, and under the control of resident foreign engineers.

Much, however, remains to be done. The great want of the country is for a thorough and systematic geological survey, in the broadest sense of that term; a survey which shall not only map out the topographical and geological features of the country, determine the age and thickness of its formations, but also take an inventory, as it were, of its mineral wealth, determine the boundaries of its mining districts, and the extent and value of the deposits of each; determine where further exploration should or should not be made, and collect into one repository the information already obtained by other explorers.

In the present paper I propose to show what has been learned with regard to the real mineral wealth of the country, and how much has been done towards a thorough and systematic development of the country's resources. For this purpose I shall supplement my own notes, the result of over three years, residence and travel in the country, with a free use of much that has been published on the subject, and of unpublished data and statistics furnished by friends, and derived from Japanese sources.

GEOLOGY OF JAPAN.

As an introduction to an account of the mineral wealth of Japan, it will be necessary to give some idea of the geological formation of the country. Reserving for another time and place a more elaborate description of the different rock formations, with their characteristic fossils, geographical distribution, and stratigraphical relations, I will attempt at present only a brief sketch of the subject.

The different strata of the Japanese Islands may be classed as follows, beginning with the most recent:

Formation.	Approx. Thickness.
1. *Alluvium and Terrace Formations*	10 to 85 feet.
2. *Volcanic Rocks*, in veins and erupted masses, (mostly Basalts)	50 to 500 "
3. *Clay rocks and pumice tufas*, (Toshibets Group of the Yesso Survey)	2,000 to 2,300 "
4. *Shales and sandstone*, (Chingkombe group of the Yesso Survey)	1,000 to 1,800 "
5. *Volcanic Rock*, in erupted masses (Andesites and Trachytes)	3,000 (?) "
6. *Coal-bearing shales and sandstones*, (Horumui Group of the Yesso Survey)	4,500 to 8,000 "
7. *Volcanic Tufas*, and erupted masses of volcanic rock. Porcelain clay rocks of Kiusiu, etc.	4,000 (?) "
8. *Shales and Sandstones*, (often metamorphic)	
9. *Granitic and Metamorphic rocks*, (Kamoikotan Group of the Yesso Survey)	3,000 to 4,000 "

The rocks of Japan, as will be noticed, are very largely volcanic; and even those of undoubted sedimentary origin are, with few exceptions, made up wholly or in part of volcanic material. Volcanic force makes itself everywhere manifest in folded and contorted strata, even the most recent rocks being often tilted at high angles. Volcanic action shows itself also in altered and metamorphic rocks, very new formations being represented in many places by slates and quartzites. Japanese coal, though of late tertiary age, is rarely found as a lignite, but usually as a true bituminous coal, and sometimes altered to anthracite or graphite.

Volcanic force continues to show itself even at the present day. Volcanoes, active and extinct, are numerous, and hot springs everywhere to be found; while earthquakes are almost of daily occurrence.

The scarcity of fossils in Japanese rocks may perhaps be attributed to the same cause. In the older rocks fossils have disappeared by metamorphic action, and in the later formations the great volcanic activity has retarded or prevented the development of organic life. For this reason it is impossible at present to say just what geological periods are represented by these Japanese strata. The coal-bearing rocks are now believed to be of tertiary age. The overlying rocks are still more recent, many of the fossil shells found therein being of the same species as those now living in Japanese waters. With regard to the age of the underlying strata, below the coal rocks, little or nothing is definitely known. Fossils said to be of Carboniferous age, and others said to be Devonian, have been reported; but, so far as I know, descriptions or figures of these fossils have not yet been published.

It is to be hoped that the fossils which were collected in the course of the Yesso Survey, with others since obtained in different parts of Japan, when examined by some competent paleontologist, may furnish more definite information as to the age of these strata.

JAPANESE MINES AND MINING.

As a further introduction to the subject of this paper, it will be necessary here to say a few words about the methods of mining employed in Japan, and the present condition of the mines.

The oldest mines in the country are those worked for gold, silver, and copper: these, with the other metal mines more recently opened, follow, with few improvements, the rude methods of exploitation adopted centuries ago. Coal mining, being of more recent date, has profited more from foreign teachings, and follows the method of the Western world, so far as it is possible to follow those methods without machinery, and with imperfect tools and appliances.

Method of Attack.—In the metal mines the deposit is usually attacked by an adit on the vein itself; or, in the case of a well-known lode, by a tunnel through the rock. The tunnels are usually constructed for drainage, and are often miles in length, requiring sometimes twenty or thirty years for their completion. To save labor, the airways, slopes, drifts, and exploring tunnels are made extremely small, and often very tortuous, following convenient seams in the hard rock, and choosing always the softest places—in vein or wall rock, as the case may be. The ore and rock are broken down with picks and wedges. Powder is used only in very hard rock, badly-shaped drills and unskilful use of powder making blasting troublesome and expensive.

Stopes.—The stopes are small, and the mine is generally "robbed" of its

richest ore first, the poorer material being left in the mine, or taken out only when the miner is forced to it. The peculiar system of administration, by which the miner is allowed almost perfect liberty to select his own working place, and is paid by the amount of ore or metal produced, encourages this double waste of the miner's labor and of the resources of the mine.

Transportation.—The ore is brought to the surface by the shortest road on the backs of men or women; and the work of these ore-carriers is made doubly hard by the narrow and tortuous character of the passages.

Draining and Ventilation are, as a rule, effected by natural means, the lowest adit or tunnel forming the drainage level (*midzunuki*) and the highest the ventilation chimney (*kemuri dachi or kasatoshi*). When it becomes necessary to work below the drainage level, a series of rude wooden suction pumps are fitted up in a special slope, each pump raising the water about six feet and delivering it in a small reservoir or tank at the bottom of the next pump of the series. They are worked by hand, requiring one man to each pump, and can raise but a very small quantity of water, and that only at the cost of much time and labor. When the flow of water becomes large, or the height to which it must be raised great, the mine is abandoned.

Ore Washing.—The ore before smelting is handpicked, and the poorer parts crushed and concentrated by washing. The washing is effected by hand-jigging on shallow basket sieves of different degrees of fineness. The finest portion, which passes all the sieves, is washed on a sleeping table or on the *ita* or shallow washing board, which is used like our "pan" or the Mexican *batea*.

Coal Mining.—The coal mines are usually worked by a sort of pillar and stall method, the pillars being taken out, as far as possible, in retreating, after the workings have reached the desired extent. The drainage is generally natural, the workings being in the hill-sides, above the level of the streams. In the Karatsu district, one of the most important in Japan, where the hills are very low, and the workings are, for the most part, below water level, pumping is necessary. Rude wooden pumps, similar to those previously described, are there used; although in some places a drainage shaft fitted with a large bucket, rope, and pulley, and worked by half a dozen or more coolies, is preferred.

The coal mines, like the metal mines, are ventilated, by natural means. In some places, where this proves insufficient, attempts are made to increase the flow of air by a rude chimney over the upcast shaft; but, as only a small charcoal fire is employed, instead of a furnace, this has but little effect.

The galleries, levels, slopes, etc., are much more regular and of larger size than in the metal mines, and permit better methods of transportation. The coal is usually brought out of the mine on flat baskets hauled by boys. Above ground, pack-horses or two-wheeled wagons propelled by man-power are used to take the coal to the boats or junks, in which it comes to market.

TO BE CONTINUED.

ABSTRACTS OF LECTURES ON MINING.—No. XX.

By Prof. W. W. Smyth, M.A., F.R.S., Royal School of Mines, London.

(*From the London "Mining Journal."*)

THE question of the mode according to which the men should be paid for doing their work is an important one at all times, but it has, perhaps, within the last few years attained a higher degree of importance in consequence of the growing independence of the men, as it is called—in other words, the greater difficulty, under certain circumstances, of getting them to come to a reasonable agreement with their masters. It is needful to remember that the operations of a mine, whether metalliferous, coal, or quarry, are very different in different parts, so that it is advisable that not only the rate but the method of payment should be of several different kinds in works of any considerable size. The question then is, what are these modes of payment, and what hold the masters have on the men to get them to do a fair day's work for a fair day's pay? Although the positions held by different men in metalliferous and coal mines respectively vary, still there is a very general resemblance between the two cases. There is one very great want in the English language in these matters, and that is some term which shall express more definitely than "engineer" the different duties attached to different operations of mining management. The term "mining engineer" is used very vaguely in some cases, and there is a good deal of uncertainty as to what it really means; it is very desirable that some definite meaning should be attached to it. In consequence of the loose way in which it has been used by all manner of people it has come to be looked on with far less respect in some districts than it ought to command. In the western districts the term is applied to men who construct or repair the engines, either at their own workshops or at the mine. In the North of England it is sometimes applied to the managers of the collieries, who are more generally termed viewers. [The lecturer a short time ago, on enquiring about a man who called himself a mining engineer, and who wished to become lessee of a mine, found that he was the carpenter of the village.] In the northern collieries the chief officer, or director, is called the viewer, and it may be that over several collieries in a district there may be one chief viewer, and under him a deputy viewer to each colliery. The latter will probably be needful at the colliery, and go down every day, or so many times a week, to inspect the workings. In the Acts of Parliament passed within the last few years—Acts on the wisdom of which opinions up to this time differ—there is some uncertainty left as to who is the real manager of the mine, and this has given rise to great difference of opinion. The viewer of a coal mine is to a great extent paralleled in a metallic mine by the manager, or superintendent; who, again, may have the superintendence of many mines in a district, as in Brazil; in such a case he may have under him chief captains, answering to the underviewers. Next come the overmen in coal mines, and captains in metal mines, in number according to the scale of the workings, some having charge underground, others on the surface; to the latter the term "grass captains" is sometimes given. These may require assistants—deputy overmen; and if a colliery work during the whole 24 hours, some will be required for the night, others for the day shifts. We next come to a class of men generally selected for their intelligence and good work, on whom a good deal of responsibility rests; these are in coal mines wastemen, or firemen. They are men who have to go through the waste passages of the mine and see that there is no obstruction to the ventilation, and they require to be thoroughly conversant with what to do in case of fire. The firemen have also (as enforced now by law) to inspect the workings carefully on a morning before the men commence working, in order to see that all is safe. This class of men do not exist in metal mines, but may be paralleled by the pitmen and shaftmen. In the coal districts the term pitmen applies to any men at work in the mine, but in the metalliferous mines it specially implies a class of strong, hale, courageous men (generally selected for those qualities), who have to do with the heavy pumping work about the shafts; and who, when not engaged on pump work, are sinking shafts, hence the term shaftmen. The above are the officers and semi-officers; between them and the rank and file come a special class of men, who are sometimes paid by the day, sometimes according to the amount of work they do; these are masons, roadmen, and timbermen. In some of the northern districts there is not a special class of timbermen, the ordinary workman is practised to place his own timber. Then, among the body of the workmen are the pikemen and hewers of coal mines, and the tributers and tut-workmen of metal mines; in Yorkshire these go by the less agreeable name of deadmen, because they carry out dead work. Then come the men occupied in removing the material which has been cut, who are known as putters when they push the wagons themselves, or drivers when horse power is employed; they are called trammers in the metal mines. Then come the class of trappers, generally boys, who have to see to the doors to regulate ventilation; these, fortunately, are not required in metal mines. Lastly, there are the onsetters, hangers-on, or fillers, at the bottom of the shaft, and banksmen, or landers, at the surface to receive the material. Besides these there may be a number of additional people employed, as office people, dressers, etc.

The officers will be paid a certain salary per year, or, as is more usual, per month; and sometimes a premium according to the results of working, or a certain proportion of the profits. A good deal may be said against this latter arrangement, and where in use it must be carried out with great judgment and at short intervals. The mode of paying the workmen by the day might seem at first sight simple, but that is by no means the case; unless the men are constantly and strictly overlooked a majority of them will not be particular about the amount they do, knowing that they will be paid the same whether they do much or little. In some cases of open quarry work, where by long experience it is known about how much a man ought to do, and where he can be more readily overlooked, the payment by the day has been found to answer. It has been proposed to check this system by testing the amount of work the man does; as, for instance, requiring him to put down so many bore holes a day—say, two—in average ground. But the question comes, will the men, in such a case, put down the hole in the best position as regards the work, or the easiest for themselves? Will the overlooker be in league with the men, and let them off too easily? And will he be satisfied, for instance, with simply hearing the shots fired from a distance? The lecturer had met with a case over the water where the manager was quite satisfied when he heard so many shots per day from a certain part of the workings, but where the fact was the men bored a hole in such a position as to make a convenient little cannon, put in the charge, and fire it, and then sit down to smoke and chat till it was time to fire another shot. As a general result, unless the men are strictly overlooked, and unless the risk is run of demoralizing the men by doubting their honesty, the system has not been satisfactory. An exception, however, must be made, as before mentioned, in the case of certain quarries. In some cases, however, it will be necessary to pay the men by the day, as in sinking a shaft where the men are liable to be constantly interrupted; or, again, the masons and timberers, as a rule, whose work, however, can be more readily superintended.

There are cases where it may be convenient to lease or sub-let a piece of ground to a man, or a set of men, in consideration for a certain sum of money, or for a certain proportion of the ore raised during a given time. These lettings should in no case exceed a twelvemonth, and it is not often they are allowed to run even so long. This method may be adopted in stream works, or in works of an exploratory nature. The name of tutwork (from the German *todt*, dead) is commonly applied to the preparatory work, as sinking the shafts, or driving the levels, because as a rule this work is not productive, though in some instances it may be very profitable. This dead work should be pushed forward as rapidly as possible under certain circumstances, and it would, therefore, be advisable to pay the men according to the rate at which they work: at per yard in the coal districts, and per fathom in the metalliferous. In order to judge correctly of this it is necessary that the manager should know by experience the different kinds of ground, and the progress which can be made in each, so as to deal fairly with the men and with himself. In metal mines there is a much greater difficulty than in the coal mines, where circumstances are more regular. This judgment will have to be made according to the following considerations:—1. The size of the level, that is, the area to be worked. 2. The hardness of the rock. 3. Its jointiness. 4. Whether it is wet or dry. 5. Expense of living in the district. 6. The ventilation and depth of the place of working. 7. Personal considerations about the men, such as the distance of the working from their dwellings, their strength and skill. 8. If included in the bargain, as it sometimes is, the distance to which they have to carry the material. If the ground is to be worked continuously there will have to be a full pare—that is to say, there must be three sets of men, each set working for a shift of eight hours; and then there is the question where they are to meet, whether in the working or in the shaft. Where it is not necessary to push the work on so hard there may be only two sets working—that is, 16 hours. It has been a great question in collieries whether it is best to have two shifts or not. In Wales and some other districts they work only one set, so that each man has like a little freehold of his own to work: the consequence is that to get a certain amount of coal sent up to the surface you must open up a very large area. The objection is that if an accident should occur, the whole of the men are exposed to it; whereas if two sets were worked, only half the men would be present at once; though of course it may, again, be said that the workings extend over double the time, and that, therefore, there is a greater chance for an accident to occur. In the metalliferous districts the tutwork will be let out to a set of men, giving them so much per fathom for a certain time, deducting from the total amount a certain sum for candles, powder, safety fuzes, smith's charge for sharpening tools, and, as is usual, so much for the men's club and the doctor; the rest is then divided amongst the men. It may be convenient sometimes to pay the colliers not by the advance of work, but by the quantity of material sent to the surface by the tram, or more commonly by the score of trams. In such cases there must be a sharp lookout to see that what they send up is well picked, and rules made that if such is not the case they will be fined, or else that wagon drawn aside is not counted. In the last few years the practice has become very common to pay by weight, the wagons being run from the pit's mouth on to a little weighing machine; the colliers having present a check weigher, whom they pay themselves. In both classes of mines, under certain conditions, lump bargains are made, to encourage and stimulate the men, especially when there is a prospect of a heavy piece of work; giving them a bonus, for example, if they get a certain quantity of work done in a given time.

In the metal mines the men are sometimes paid on the amount of dressed ore they produce; and in the slate quarries according to the amount of good split slates they make; the party of workmen then have their own dressers,

etc. Everything is done to ensure economy. In the metal mines the plan usually joined with this is paying the men by tribute. In copper and lead, and in some tin mines, not all the lode is worth working, only certain ribs or portions of it; the rest is dead work, and must be left. In such a case you cannot introduce the tutwork system; you would probably have the good ore so much mixed and adulterated with dead ground that it would not be worth while, in some instances, to attempt to separate them again. Under some conditions, of course, where the ore is much scattered, it will be necessary to work the whole of the lode; and then it would be desirable to remove this by tutwork, such as is commonly called stoping. But where you have bunchy or stringy lodes the case is quite different. The plan is to give the men a bargain, where they take a certain tract on tribute, as it is said, and this will stimulate them to their best. The tract is let to them to get out all the ore they can, in the best way they know, within that piece of ground, on condition of receiving for every £1 worth of ore they raise a tribute of so many shillings—it may be 15s. if the ground be poor, or 5s., or even 2s. 6d., if it be rich. The "pitch" of ground may turn out to be very much richer than was supposed when the tribute was set, so that in the course of their time—a month or two months—they may make amongst themselves in some cases several hundred pounds. This is a most admirable method for fostering habits of observation and intelligent work on the men; and in many instances this kind of work has led to great discoveries of branches or side veins, or portions of orey ground not suspected. At the same time it requires strict attention on the part of the captains and agents on several points; men working a poor pitch may help themselves quietly to portions of the produce of a neighboring richer pitch in order to increase the value of the material they send up. And, again, if they came on a rich piece of ground towards the end of the time of their bargain they might throw down a mass of stones in front of it, or even plaster it over, so as to endeavor to deceive the agent when he came round again before setting the pitches afresh, and then offer to take it again at the same rate. These disorders must be avoided by the agent being a practical man, and observing what the men are doing from day to day, and try to know thoroughly the nature of the ground the men are working.

NOTES.

THE GARTSHERRIE COAL-CUTTING MACHINE from Scotland, which was on exhibition at the Centennial, is now in successful operation in the mines of the Watson Coal Company, at Brazil, Ind.

HYDRAULIC MINING IN GEORGIA.—The Dahlonega (Ga.) *Advertiser* says that a canal seventeen miles long has been cut to convey water to the Nacoochee mine, in White County, which enables the miners to use the hydraulic process on 10,000 acres of rich mining property.

IRIDESCENCE ON ZINC.—An original recipe for giving beautiful and durable rainbow colorations to zinc is communicated by HESS to the *Metallarbeiter*. The zinc may be in any form, cast or sheet, but must be pure, dry, polished, or filed, and the coloration is the more brilliant as the materials of the bath are pure, so that the best effects are got with chemically pure reagents. The bath consists of 30 grammes tartrate of copper (weinsaures Kupferoxyd), 40 grammes caustic potash, and 480 grammes distilled water. On subjecting the zinc to the action of the bath for a couple of minutes it appears violet; for three minutes, deep blue; 4¼ minutes, green: 6½ minutes, a golden yellow; 8¼ minutes, purple violet.

THE TALLEST LIGHTHOUSE IN THE WORLD.—The firm of CAIL & Co. have begun the construction of the great lighthouse which is to stand on the brow of the Trocadero, in Paris, during the Great Exhibition of 1878. The lighthouse in the 1867 exhibition was only 53 meters (180 feet) high, whereas the present one will reach 127 meters, or 413 feet in height. The lighthouse has been ordered for Plymouth, and its white and red lights will be seen seven leagues on the main. It will contain ten rooms for attendants, two provision bunkers, an infirmary, and a bedroom with ten beds for the shipwrecked. About 50 meters (152 feet) above the level of the sea a movable annular plate is provided, carrying a big cannon for shooting the salvage line within a range of 8,000 to 10,000 meters. Near the base of this gigantic pharos there is a complete and improved lifeboat arrangement, which allows of a lifeboat being lowered by one man.

SOUTH AFRICAN INTERNATIONAL EXHIBITION.—This exhibition will be opened at Cape Town, February 15th, 1877. The sixth class in the exhibition is devoted to hardware, edge tools, cutlery, metal work of all kinds, such as nails and screws, knives and forks, bolts, locks, latches, hinges, pulleys, galvanized iron, hollow ware, tin ware, fireproof safes, doors, etc., telegraph and tram wires, wire and wirework. The tram wires are an article largely used in working the diamond mines. The seventh class comprehends all kinds of machinery except agricultural—cranes and hoists, road engines, weighing machines and pumps. Lightning conductors, which are extremely necessary in the African colonies, and particularly in Natal, will be entered in this class. The eighth class is agricultural, and includes such implements as picks, ploughs, harrows, drills, hoes, rakes, chaff-cutters, spades, shovels and axes. The ninth class is concerned with science and education, books, printing machinery and materials, photographic instruments, instruments of precision, measures of length, meteorological, nautical, optical and astronomical instruments. Gold and silver medals and diplomas of merit will be given to successful exhibitors.

THE MINING OUTLOOK IN THE SOUTH.—In the mineral belt running through Virginia, the Carolinas and Georgia new discoveries and new openings are being made that may give a new life to that impoverished region. The work comprises every variety of mining—the ores, with few exceptions, being of rather low grade, but existing in great abundance, and capable of being worked at an expense of but $2 or $3 per ton. The pay of one laborer in Nevada will hire five negroes in either of the other States named, while the cost of a cord of wood in the bonanza districts will purchase a dozen cords in North Carolina or Virginia. In the latter State the Bertha Mine will make its first clean up in December, the result of which is looked for with interest as testing the profitableness of hydraulic mining in the Old Dominion. In Georgia several placer mines are being profitably worked by private individuals who make no public reports. The King's Mountain Mine, in North Carolina, is doing well on ores that yield but $5 per ton, the enormous deposits more than compensating for the lightness of the product. In Granville County large tracts of land bearing gold quartz of excellent quality have been taken upon leases, and engineers are on the ground laying out work for mining on the most approved principles. The modern improvements in the machinery and implements for mining, and in the process of ore treatment, are opening up a comparatively new industry to our Southern friends that must give a value to thousands of acres that have heretofore been regarded as almost worthless. The whole country will hail such a consummation with hearty approval.

THE TARIFF SILVER MINE is located in Summit County, Colorado. This property is to be steadily worked all winter. ROBERTS & Co., and CLOSE & Co., are the lessees, eleven men to be employed—the first-named parties working west, and the others east of discovery shaft. They have laid in about $3,000 worth of supplies, and plenty of fuel to last them all winter. Each party is to sink a shaft 60 feet deep, and then run levels; one of these will be a continuation of the main or discovery shaft, which is now nearly 100 feet deep, and close to the level which has been run from the point where the lode was intersected by a cross-cut tunnel 270 feet west. The ground east of discovery has not yet been explored. The discovery is the centre of the 1,500-feet claim, while the extensions, east and west, make up a property of 4,500 feet. There is in this belt, altogether, ten lodes, and a cross-cut 700 feet long, which will cut them all. The ore that has been taken out in sinking and drifting has all been high grade—the first-class running from 251 to 501 ounces silver per ton, and from 25 to 30 per cent. lead. The ore vein (or pay streak) has varied in thickness from 4 to 14 inches. There will be an immense pile of ore to come over the Range from the Tariff next spring.—*Georgetown Miner*, Nov. 18.

TRIAL OF THE FALL RIVER PUMPING ENGINE.—We take the following satisfactory report of the Worthington Pump from the Fall River *Daily News*: The pumping engine built by HENRY R. WORTHINGTON, Esq., in 1875, for the Fall River Water Works, was subjected Oct. 4th to a thorough test to ascertain whether it was capable of performing the "duty" guaranteed by the builder. Two things were guaranteed by Mr. WORTHINGTON: First, that the engine should be capable of pumping 5,000,000 gallons in 24 hours to a height of 200 feet. Secondly, that the engine should show a "duty" of 65,000,000; that is, should be capable of raising 65,000,000 pounds of water one foot high with 100 pounds of coal. The engine had previously been tested with reference to the first requirement, and had exceeded the capacity of 5,500,000 gallons in 24 hours. The test last Wednesday was with reference to the second requirement, that of "duty." The test was conducted by Mr. F. W. JENKINS, principal assistant of the Worthington Hydraulic Works; Capt. D. H. JOHNSON, formerly Superintendent of the Salem Water Works, now agent for the Worthington engines, and the Chief Engineer and assistants of the Fall River Water Works. The results of the trial are summarized below:

Trial began at 9:30 A. M.; ended at 10:30 P. M. Total number of strokes, 31,376. Average number per minute, 40·23. Average length of stroke, 49·7 inches. Capacity of pump per stroke, 82·3 gallons. Total amount of water pumped, 2,582,245 gallons, or 22,535,932 pounds. Total lift, including friction in force main, 217,52 feet. Total weight of coal burned, 6,600 pounds. Duty, 70,977,177, showing an excess of 9 per cent. above the guarantee.

This result, as well as the substantial and thorough manner in which the engine is constructed, reflects great credit on the ability and honesty with which Mr. WORTHINGTON has fulfilled his contract, and the city is fortunate in the possession of a pumping engine that has proved so satisfactory in every respect.

NONESUCH COPPER MINING COMPANY (annual report).—Following is the superintendent's report of the operations of this company for the year ending Nov. 7: "During the past year our mining has been confined to opening, sinking, drifting and cross-cutting, with the view of finding out what we have on the property before putting up machinery. At present I think there is enough done to warrant the erection of a large mill, and there is now ground open ready for stoping 30,000 tons of good stamp rock, also 1,500 tons assorted stamp rock are now on the surface. The machinery recently purchased from the Union Company consists of one stamp engine, 24x30 inch cylinder, and sixteen heads of GATES' patent stamps, each weighing about 1,100 lb., which, I think, will stamp 40 tons per day; and, in addition to these, we have on hand sixteen heads of improved Cornish stamps, which together will give us a capacity of about 65 tons per day; also one hoisting-engine with two drums, and of ample power for stamping the above-mentioned rock. The machinery is now on the Union Company's property, and about 300 feet from the tram-road. Our dock is finished and the tram-road is nearly finished. The engines and machinery for hoisting and stamping are all paid for, and can be moved and put in running order with the necessary washers and everything complete for about $10,000. You will see by the inventory, we have on hand and paid for, teams, tools, and other necessary supplies, amounting to $43 081. The total liabilities of the company are something less than $10 000. The money in the treasury, and balance due on assessments, is a little over $30,000. Thus it will be seen that after the mill and machinery are moved and put in working order, and all liabilities paid, the company will have in money and necessary supplies about $53,000 as a working capital, which will be ample. I estimate a profit of $1,200 to 1,500 a month from this time, and this may be largely increased by adding to the mill capacity, as it can be done from the earnings, without further assessments. The details of mining operations are given below:

Whole number feet of sinking, 503½, at $12	$6,042 00
" " " drifting, 1,110½, at $7	7,773 50
" " " of cross-cutting, 257½, at $6	1,545 00
	$15,360 50
Cost of landers, wheelers and teamsters	3,900 00
" new buildings	4,250 00
" clearing of land	1,200 00
" one thousand cords of wood	1,500 00
" dock, complete	6,207 00
" tram-road	6 500 00
" machinery, tools, materials, supplies, teams, etc	13,082 50
	$52,000 00

—*Northwestern Mining Journal, Nov. 22.*

LABOR NOTES.—*The Tunnel Hill Coal Mines* in Perry County, Ohio, six in number, are closed, the miners having struck for higher wages. The operators were informed on the 7th inst. that an advance was demanded by their employes, and it was agreed that the price would be increased twenty-five cents per one hundred bushels. This did not satisfy the miners, and they all quit work. The operators declare that they will close their mines permanently before they will pay a farthing more.—*Cleveland Trade Review.*

Raymond City Coal Company.—An attempt was made by this company recently to cut their miners' wages down to one and a-half cents per bushel for digging. This was refused, and the miners are ordered to leave the company's houses. Trouble is feared.—*Huntingdon (W. Va.) Advertiser*, Nov. 23d.

Cost of Mining in Kentucky.—Coal is mined at Coalton, Boyd County, Kentucky, at 45 cents per ton, screened over a large screen.

Coal Miners Wanted.—Coal miners are wanted at Anna and White Oak mines, near New Athens and Marissa, Illinois, on the Cario Short Line Railroad, 30 and 40 miles from St. Louis. Steady work guaranteed for six or twelve months. Average thickness of vein is seven feet. Price paid, two and a-half cents per bushel.

Wages Paid in Ohio Coal Mines.—Work has been steady in the mines both at Nelsonville, Ohio, and at New Straitsville; the good prices for mining now being paid, 60 cents per ton, encourages the men to put in all the coal possible. The only drawback to an increase of business is the lack of cars. There was shipped from New Straitsville for the week ending Nov. 11th, 1876, 9,120 tons.—*Gazette.*

Strike in the Cedar Valley, Iowa, Coal Mines.—The miners here are on strike for an advance from ninety-three cents to one dollar per ton for digging. A correspondent in the *National Labor Tribune*, of the 25th ult., writes from the Cedar Mines as follows: We have been working here for four cents per bushel until last May, when the company told us that if we would dig for $3.60 per hundred bushels that they could give us steady work. We held a meeting and came to the conclusion that it was useless to strike, as it was as good as was doing, and in some instances it was five cents a ton better. We worked from the first of May until the first of November at 93 cents a ton and got pretty steady work. By working hard the most of us who had no sickness in our families managed to keep out of debt. On the first of November we held a meeting and concluded we ought to have one dollar a ton for the winter run, which the Superintendent refused. We struck and sent word to Avery Coal Works, nine miles east of here, owned by the Union Coal Company, and Happy Hollow, owned by the same company. We asked them to help us get our price as it would get it for them. They said they would not strike, that they had all they could do, and that was all they wanted. They are now filling our contracts, and say they wish we would stay on strike for six months. There are now two men here and all through the State for every one that is needed.

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending Nov. 25.

Tons of 2,240 lb.	1876. Week.	1876. Year.*	1875. Week.	1875. Year.*
Wyoming Region.				
D. and H. Canal Co.	58,306	1,827,783	61,096	2,780,228
D. L. and W. RR. Co.	65,578	1,721,459	44,151	2,750,966
Penn. Coal Co	28,798	985,145	26,063	1,243,453
L. V. RR. Co.	†	831,740	†	839,623
P. and N. Y. RR. Co.	†	21,259	†	84,318
C. RR. of N. J	45,259	1,225,059	40,804	1,321 210
Penn. Canal	10,062	403,971	7,635	297,500
Lehigh Region.				
L. V. RR. Co	†	2,475,453	†	2,914,968
C. RR. of N. J	40,837	1,273,784	21,938	708,977
D. H. and W. B. RR.	1,250	40,485	1,344	63,465
Schuylkill Region.				
P. and R. R. RR. Co.	136 309	4,462,532	153,412	4,406,084
Shamokin & Lykens Va.	†	832,791	†	1,107,455
Sullivan Region.				
Sal. and Erie RR. Co.	†	29,448	†	9,714
Total				
Increase		—	—	—
Decrease	—	—	—	—

* Year beginning January 1st.
† These reports were not received this week.
The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent. of the whole production.

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Piedmont Railroads amounts to 477.953 tons, as compared with the corresponding period in 1875.

Belvidere Delaware RR. report.	Week.	Year 1876.	Year 1875.
Receipts of coal at Coal Port (Trenton)	10,073	281,442	182,114
" " " South Amboy	11,692	401,544	241,793
Shipments at Coal Port (Trenton)	9,012	272,374	179,271
" South Amboy	12,644	455,040	309,325

Perth Amboy business :

	Tons.
Received for the week	27,164
Shipped for the week	13,095
On hand Nov. 25	55,994

Receipts of Coal at Boston. for the week ending Nov. 24, and years from Sept. 1, 1875 and 1876.

From	Week. Tons.	Previously. 1876. Tons.	1875. Tons.
Alexandria and Georgetown	—	11,087	37,131
Philadelphia	8,380	224,620	253,302
Baltimore	—	39 341	45,546
Other places	1,380	83,912	104,784
Great Britain	409	1,264	704
Nova Scotia	—	12 853	10,922

Coal Shipped at Piclou, N. S., for week ending Nov.

18, 1876	3,877 tons.
Previously exported, since Jan. 1	163,765 "
Total to date	167.642

The Production of Bituminous Coal for the week ending Nov. 25, was as follows :

Tons of 2,000 lb., except where otherwise designated.

Cumberland Region, Md.	Week, Tons.	Year, Tons.
Tons of 2,240 lb	37,377	1,667,354
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb	†	397.952
Broad Top Region, Pa.		
Huntingdon and Broad Top RR	4,342	144,306
*East Broad Top	1,152	59,594
Clearfield Region, Pa.		
*Snow Shoe	991	45,317
*Tyrone and Clearfield	28,269	1,026,796
Allegheny Region, Pa.		
*Pennsylvania RR	4,432	181,851
Pittsburgh Region, Pa.		
*West Penn. RR	4,024	176,539
*Southwest Penn. RR	1,148	50,586
*Penn. & Westmoreland gas coal, Pa. RR.	20,772	756,544
*Pennsylvania RR	5,709†	208,118

* For the week ending Nov. 14.
† This report was not received this week.

The Production of Coke for the week ending Nov. 14.

Tons of 2000 lb.	Week.	Year.
West Penn. RR	2,274	45,836
Southwest Penn. RR	10,934	462,694
Penn. & Westmoreland Region, Penn. RR.	1,384	50,083
Pittsburgh, Penn. RR	3.149	138,962
Total	17,741	697,575

COAL TRADE REVIEW.

NEW YORK, FRIDAY EVENING, Dec. 1, 1876.

Anthracite.

THERE has been nothing of particular interest in the trade during the past week. Business is very quiet, but this has been expected, owing to the fact that the bulk of the Winter's requirements was supplied during the past three months. Even the low prices of the circulars that have been issued since the last auction sales are being shaded. The very mild weather we have had has very much decreased the retail business, which, however, will receive new life if the present weather continues.

Last week we noted the Lehigh and Wilkes-Barre Company's quotations for Lehigh Coal as follows: Lump and Stove, $3 75 ; Broken, Egg, and Chestnut, $3.25. Under date of Nov. 28, the Lehigh Coal Exchange has issued a circular quoting as follows : Lump and Stove, $3 75 ; Broken and Egg, $3.25 ; Chestnut, $3.50 ; Pea, $2.75. It will be observed that these circulars differ from each other in but one particular, that of the price of chestnut coal, the Lehigh and Wilkes-Barre Company being 25c. per ton under the price fixed by the exchange. This indicates what is generally understood, an independent action on the part of the Lehigh and Wilkes-Barre Coal Company.

The Lehigh Valley Railroad Company has refused to make any concessions in freights, so that the business of the road and the receipts of Lehigh coal in this market are likely to be very much diminished.

As to when and how a better state of things will and can be brought about in the coal trade, has become quite a question, and is asked by every one, though it receives but few, if any, satisfactory answers. Were the existing competition only between individuals, a sufficient number would, in time, become bankrupt and leave a profitable business to those who had been able to weather the storm ; but, in the case of the large railroad and coal companies, the weak ones will only fall into the hands of receivers, which would relieve them of large interest payments, and place them in a position for such strong competition as would threaten ruin to the now solvent companies. This state of affairs might suggest the necessity of another combination, but a careful consideration of all the conditions affecting the trade shows no relief possible from this source, and nothing to do but to patiently await a natural adjustment of existing trouble ich are in great measure the result of a total disregard of the laws of trade.

That a reduction of wages is to take place continues to be well understood ; it will probably go into effect, generally, by January 1, although a beginning may be made this month.

A reduction in the price of Pittston coal at retail is anticipated to take place at an early day.

Bituminous.

A very large business continues to be done by the Clearfield region, although there are complaints of an insufficient supply of cars. The Cumberland region shows a tonnage for last week over 11,000 tons less than for the corresponding week of 1875, making a total falling off since January 1 of over 478,000 tons. Last week we noticed that two of the companies had stopped shipment by canal. Others have been preparing to do so, and all will probably be driven to it if the existing severe weather continues a day or two longer. The business of this region is practically over for the year.

Some time ago we noted the improving condition of the coal business of the Chesapeake and Ohio Railroad. This, we fear, will receive a severe check if the following rates of freight, which took effect November 1, be maintained :

To Richmond, Va.	
Cannel coal	$5 00
Splint and Block for domestic consumption.	4 50
Gas coal (other than cannel)	3 75
Steam coal, New River District	3 25
" " Kanawha District	3 50

The introduction of splint coal was progressing very satisfactorily, but already it appears to have sustained a heavy blow by the advance of $2.50 a ton in the price to consumers in this city. The gas coal of the region has received but little more than a trial, and although good results have been shown, yet it will be necessary to offer liberal terms to secure its introduction in large quantities. As to the steam coal, to attempt to charge rates of freights higher than the selling price, f.o.b. at tide-water, of the established Clearfield and Cumberland coals, is to prohibit all business in them in the Eastern market.

We much regret to see so short-sighted a policy adopted by the managers of the Chesapeake and Ohio Railroad, and urge its reconsideration in the general interests of this promising coal-field. The Kanawha splint coals have, for many purposes, no superior in this country, and with low rates of freight the coals mined in that region would obtain a firm foothold in the Eastern markets. There is, however, a great difference between a favorable reception and an established reputation and footing in a market, and the managers of the Chesapeake and Ohio Railroad, by this ill-advised step, endanger a promising industry, and retard the development of that trade upon which the prosperity of the road itself so largely depends.

Wholesale Prices of Anthracite Coal [f.o.b. at the Tide Water Shipping] Ports per ton of 2240 lb.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
‡Lackawanna and Scranton at Hoboken and Rondout	3 00	3 00	3 00	3 00	3 75	3 75
Pittston at Newburg	2 80	2 80	2 80	2 85	3 60	3 70
Wilkesbarre at Port Johnston	3 00	3 00	3 00	3 00	3 75	3 25
Plymouth, R. A.	....	....	3 00	3 00	3 85	3 35
Susque. Coal Co. at Amboy W.A.	3 00	3 00	3 00	3 00	3 75	3 25
Kingston at Hoboken	3 00	3 00	3 00	3 00	3 75	3 25
Lehigh Coals.						
Old Company at Port Johnston	3 75	....	3 25	3 25	3 75	3 25
Old Company's Room Run "	3 75	....	3 25	3 25	3 75	3 25
Sugar Loaf, Hobok. & Amb. "	3 75	....	3 25	3 25	3 75	3 50
Lehigh Coal Exchange "	3 75	....	3 25	3 23	3 75	3 50
Honey Brook Lehigh	2 75	....	3 25	3 25	3 75	3 25
Beaver Meadow at South Amboy	3 75	....	3 25	3 25	3 75	3 25
Schuylkill Coals at Philadelphia.						
Schuylkill white ash	....	....	....	....	....	....
Schuylkill red ash	....	....	....	....	....	....
Lorberry	....	....	....	....	....	....
Lykens Valley	....	....	....	....	....	....
North Franklin red ash	....	....	....	....	....	....

‡ Boats towed by the D. & H. C. Co. at its expense to and from New York harbor.

	Per ton.
Freight from Hoboken and Weehawken to New York	40c.
" " Elizabethport & Port Johnston to N. York.	40c.
" " South Amboy to New York	40c.

Freight by the boats of the companies from Hoboken, Port Johnston, Weehawken, Rondout, South Amboy and Perth Amboy to New York City and vicinity 50c.

Freight by the Pennsylvania Coal Company's boats from Newburg to New York 65c.

Lackawanna coal delivered to carts in New York or Brooklyn, 50 cents per ton additional.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in NewYork.
Westmoreland and Penn. at Greenwich, Philadelphia	$4 70	$6 00
" " at S. Amboy	5 50	6 00
Red Bank Cannel Pa. at Philadelphia	8 00	8 50
Youghiogheny, Waverly Co., at Balt	4 25	5 65
Despard, West Va.	4 50	6 00
Murphy Run, West Va., at Baltimore	4 50	5 85
Fairmount, West Va., " "	4 40	5 70
Newburgh Orrel, Md. " "	4 50	6 00
Cannelton Cannel, W. Va.	....	10 00
" Splint, " at Richmond.	5 50	7 00
" Gas Coal at Richmond.	4 15	5 65
Peytona Cannel W. Va at Richmond	....	10 00

Manufacturing and Steam Coals.

Cumberland at Georgetown and Alexandria, Va	3 50@3 75	5 20
Cumberland, at Baltimore	3 65@3 80	5 45
Clearfield f.o.b. Canton, Baltimore	3 40@3 65	5 25

Pennsylvania Semi-Bituminous Coals

At the mines, per 2,000 lb., 50c. f.o.b. at Greenwich, Phila., for Eastern and Foreign shipments, per 2,240 lb. $3 25@340 for Sound ports, 3 50@3 65, through Delaware and Raritan Canal, for points on Hudson River, $3 80 f.o.b., at South Amboy, N.J., per 2,240 lb., $4 50@4 70. Discharged, in New York, per 2,240 lb., $5 00@5 25.

Foreign Gas Coals.

	Sterling.	Am. cur cy.
Newcastle, at Newcastle-on-Tyne	9/6@11/	6 50@ 7 00
Liverpool House Orrel, at Liverpool	26/	13 00
Ince Hall Cannel "	42/	18 00
" Gas Cannel "	28/	13@14
Scotch Gas Cannel, at Glasgow, nominal,	25/	7 50
	Gold.	
Block House, at Cow Bay, N. S.	2 00	4 75
Caledonia, at Port Caledonia,	1 50	4 25
Glace Bay, at Glace Bay	1 50	4 25
Lingan, at Lingan Bay	1 75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion & Vale mines, at Pictou.	2 25	5 75

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove.	Chestnut.
Pittston coal, in yard	$4 20	$4 50	$3 80
Lackawanna coal, in yard	4 20	4 50	3 80
Wilkes-Barre, delivered	5 00	5 30	4 60
Lehigh & Locust Mountain, del'd	5 50	5 50	5 00
Schuylkill Red Ash, del'd	6 00	6 00	5 50

The Cost of delivery for Pittston and Lackawanna coal ranges from 40 cts. to $1 10 per ton, according to distance from the yard.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb	$18 00
Liverpool House Cannel " " "	22 00
American " " "	13 00
Cannelton Block, or splint, " " "	10 00
American Orrel " " "	11@14
Red Bank Cannel " " "	10 00
Cumberland " " "	7 00

Baltimore, Md. Nov. 20, 1876.

Reported by our Special Correspondent.

ANTHRACITE.

Wholesale or Trade Prices per 2240 lb.

Wilkes-Barre "Lee" or "Diamond," Pittston and Plymouth. White ash.	In cars at depot.	By boats afloat.
Lump and steamboat	$3 85	$3 55
Broken	3 85	3 55
Egg	3 85	3 55
Stove	4 35	4 05
Nut	3 85	3 55
Shamokin. (red or white ash), and "Boston," free burning white ash,		
Egg	4 10	3 80
Stove	4 35	4 05
Lykens Valley, red ash,		
Egg and stove	5 35	5 05

From wharf or yard, wholesale, 50@75c. additional.
By retail, all kinds and sizes, per 2240 lb. $6 00@7 50

BITUMINOUS.

George's Creek, Cumberland f. o. b. at Locust Point ..... 3 75@4 00
West Virginia Gas f. o. b. at Locust Point 4 50
Youghiogheny Gas, f. o. b. at Locust Point 4 50
Swanton 4 00

Boston. Nov. 25, 1876.

COAL is weak. The supply of anthracite for the whole country is evidently far in excess of the demand, and prices tend downward.

In our local market the retail trade has begun to improve, in consequence of the colder weather, but cargo prices are weak. The surburban failures cause a little uneasiness.

Buffalo, N. Y. Nov. 29, 1876.

Reported by LEE & LOOMIS.

Deliv'red at	Elmira.	Ithaca.	Syracuse.	Rochester.		Oswego
	Afloat.	Afloat.	Afloat.	Afloat	ret. del.	f.o.b.
Grate	$4 20	$3 45	$3 60	$4 30	$5 55	$4 55
Egg	4 20	3 55	3 70	4 40	5 65	4 65
Stove	4 60	4 05	4 20	4 90	6 15	5 15
Nut	4 35	3 80	3 95	4 65	5 90	4 90

Delivered at	Erie.	Buffalo.		
	f.o.b.	Afloat.	f.o.b.	ret. del.
Grate	$5 05	$4 55	$5 05	$5 80
Egg	5 15	4 65	5 15	5 90
Stove	5 65	5 15	5 65	6 40
Nut	5 40	4 90	5 40	6 15

Chicago, Ill. Nov. 29, 1876.

Lackawanna Stove $8 00
" Chestnut 8 00
" Grate and Egg 7 50
Erie and Brier Hill 6 00
Wilmington and Illinois ..... 3 50@ 4 25
Blossburgh ..... 7 0.

Cincinnati, O. Nov. 27, 1876.

Reported by A. B. BUCHANAN & Co.

The following are the quotations of coal in this market to-day. The recent rise in the river has added several million bushels of coal to the stock held here, consequently no change for advanced prices.

	Per ton of 2000 lb.	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat		@7c.	—
Pomeroy coal	"	@5c.	—
Kanawha "	"	7½c.	—
Ohio River Coal	"	5¾c.	—
Cannel coal, according to quality	"	@16c.	—
The following are the retail prices delivered			
Youghiogheny		10@11c.	—
Pomeroy		9c.	—
Cannel		@22c.	—
Kanawha		10c.	—
Anthracite, per ton		$9 00@9 50	
Coke, at yard		10c.	—
Coke, hard and soft, delivered		— @9c.	—

Cleveland, O. Nov. 27, 1876.

Specially reported by Messrs. LAMBIE & BATES.

Per ton of 2000 lb. f. o. b. vessels.

WHOLESALE.

	1 to 10 tons.	10 tons upw'd.
Lacka'a., Wilkesbarre and Pittston egg and grate,	7 00	6 75
" " " stove	7 50	7 25
" " " chestnut	7 25	7 00

Lehigh to be $1 25 per ton higher.

All sales to be strictly cash with order or C. O. D.

Indianapolis, Ind. Nov. 27, 1876.

Specially reported by Messrs. COBB & BRANHAM.

Wholesale on board cars, and retail delivered to consumers.

Per ton of 2000 lb., bushel of 70 lb.

BITUMINOUS.

White River, per ton	$2 50	Peytona cannel, per ton.	5 75
Brazil Block, "	2 50	Indiana Cannel	4 50
Highland, grate, "	2 25	Hocking Valley	4 25
Block coal, nut, per car.	18 00	Youghiogheny	4 50
Highland " "	18 00	Blossburg (smithing) ...	6 50
Block Slack "	17 00	Piedmont "	6 50
		Gas coke, per bushel	10

ANTHRACITE (Lackawanna and Wilkes-Barre.)

Broken	$8 35	Nut	8 50
Egg	8 35	Stove	8 75

Lehigh Anthracite.

Broken	9 75	Nut	9 50
Egg	9 75	Stove	10 00

Retail, per bushel, delivered.

Sand Creek	15c.	Block Nut, steam	8
White River	13	" Slack, "	7
Brazil Block	14	Peytona Cannel	28
Highland grate	13	Virginia "	27
Block Nut, domestic use.	12	Youghiogheny	20
Highland Nut, " "	12	Blossburg	26
" " steam	8	Piedmont	26

GAS COKE (measured.)

Crushed	15c.	Lump	12c.

ANTHRACITE.

Wilkes-Barre and Lackawanna (all sizes) ..... $9 75 per ton.
Lehigh, retail ..... $11 50 per ton.

Louisville, Ky. Nov. 27, 1876.

Specially reported by Messrs. BYRNE & SPEED.

General complaint has been heard for the past week in all branches of trade of suffering in consequence of the political uncertainties. The market for pig iron has been unusually dull, but in view of the temporary nature of the cause, prices remain same as last.

Four months allowed on quotations below.

WHOLESALE.

	per bushel		per bushel
Pittsburg	6½c.	Pine Hill	—
Raymond City	6½c.	Kentucky	7c.

RETAIL.

	per bushel		per bushel
Pittsburgh	10c.	Peytona Cannel	18c.
Raymond City	10c.	Buckeye "	
Pine Hill	13c.	City-made Coke	8c.
Kentucky	9c.	Anth., per ton, $10 00 to 10 50	
Screened Pittsburgh per load		$3 50	
Screened Raymond City		2 50	
Pine Hill (Kentucky)		2 25	
Cannel		4 50	
City-made Coke		4 00	

Milwaukee, Wis. Nov. 27, 1876.

Specially reported by Messrs. R. P. ELMORE & Co.

The coal trade is not as good as might be desired. The reduction of prices east compel a decline here. The following are the prices with us for the present:

Retail price per ton of 2000 lb.

Lehigh Lump	$ 8 00	Briar Hill, select	$7 00
Lehigh Prepared	9 00	Blossburgh	7 00
Lackawanna (all sizes) ..	8 00	Cannel	6 00
Pittston	8 00	Pittsburgh	6 50
Scranton	8 00	Oak Hill	6 00
		Steam coal	4@5 00

New Orleans, La. Nov. 22, 1876.

Reported by C. A. MILTEBERGER & Co.

Pittsburg coal, wholesale, by boat-load, per bbl	27@28c.
" steamboats, per bbl	40c.
" to manufacturers	42½@45c.
" to families	45@50c.
" shipments, per hhd	$5 00
Anthracite, wholesale, per ton	8@8.50
" retail, "	12@13
Virginia Cannel, per bbl	80c.
Scotch " "	..c.
Mt. Carbon, wholesale, per bbl	...
" " retail, "	50c.
St. Bernard wholesale, per bbl	25c.
" steamboat	30c.
" retail, "	40@45c.

Pittston, Pa. Nov. 28, 1876.

Pennsylvania Coal Company's Coal in yard, ton of 2000 lb.

Retail.

Lump, Egg and Stove	$2 25
Chestnut	2 00
Pea	1 00

Delivered, fifty cents per ton additional.

Richmond, Va. Nov. 28, 1876.

Specially reported by S. H. HAWES, Dealer in Coal.

Per ton of 2240 lb., f.o.b.

Kanawha Cannel	$9 00	New River Bituminous,	$4 40
Coalburgh Splint	5 70	Clover Hill Coal	3 50
Lewiston "	5 70	James River Bitum ...	3 30
Kanawha Gas coal	4 90	" " Carbonite,	5 00

San Francisco, Cal.

From the *Commercial Herald*, Nov. 23, 1876.

Imports from Jan. 1st to Nov. 14:

	tons.		tons.
Anthracite	10,784	Vancouver Island	83,763
Australian	123,363	Rocky Mountain	163
Coos Bay	34,360	Seattle	80,009
Cumberland	12,421	Bellingham Bay	19.635
English	91,294	Chili	3.150
Mt. Diablo 10 mos	93,964		

The market continues to be liberally supplied with home and foreign, causing low prices to prevail for cargo parcels. Some complaint is made that retail jobbing rates are not in accord with the sharp decline in cargo rates. We note the following arrivals: Per *Montana*, 1,100 tons Seattle; *Bremen*, 2,700 tons Liverpool; *Jennie Stella*, 200 tons Coos Bay. The cargo of Halbreath per ship *Berkshire*, more or less injured at sea by fire and water, was sold at public auction on the 22d, by S. I. JONES & Co., for account of whom it may concern. We clip the following from one of our exchanges in Washington Territory: "Mr. JAMES LONGMIRE, of Yelm Prairie, W. T., has given us more information concerning the coal beds discovered by him last summer. The exact locality of the mines we are not informed, but believe they are in the vicinity of the Nisqually River, thirty or forty miles from its mouth. The veins are almost endless in extent, very wide, and of a superior article of Coal, if not the best that has been discovered in the Territory. We have seen specimens, and should judge it equal to Lehigh. Mr. LONGMIRE informs us that it is not difficult to be got at, and that the grade of a road from the beds to the Sound is an almost level one. Puget Sound is the Pennsylvania of the Pacific coast, and every day brings evidence of the vastness of her coal fields. The spot price of Cumberland ex ship, $14@15 in bulk, $17 in casks; Lehigh, $13.50@15; Pittston, $14@14.50 for egg; Sydney Steam, $7.50, Wallsend, $8@8.25; West Hartley, $8.50@9; Mt. Diablo, fine $5.75, coarse $7.75; Coos Bay, $9; Seattle, $9; Bellingham Bay, $8. Recent arrivals here include 800 tons Seattle per *Levi Stevens*, 600 tons Coos Bay per *Empire;* 1,320 tons from Newcastle, N. S. W., per *Remington*, and 2,393 tons from Liverpool per *Northern Light*. At auction, 1.800 tons ex *Berkshire* sold, as is, at $6. 87½, 30 days. The cargo of 1,307 tons Australian, per *Carpo*, from Newcastle, N. S. W., Oct. 28th, is to be sent entire to Hongkong for a market.

St. Louis. Nov. 27, 1876.

Reported by JAS. J. SYLVESTER, Secretary of the Anthracite Coal Association.

Retail prices, delivered.

ANTHRACITE.	per ton.
Lackawanna	$9 00@10 00
Wilkes-Barre	9 00@10 00
Schuylkill	9 00@10 00
Lehigh	10 00@10 50
BITUMINOUS.	
Blossburg	9 00
Pittsburg	4 50
Indiana Block	4 00
Big Meadow	3 00
Illinois Coals	2 50@3 00
Connellsville Coke	4 50

Toledo, Ohio. Nov. 27, 1876.

Specially reported by GOSLINE & BARBOUR.

We quote as follows for retail delivery:

Lackawanna lump	$6 75	Lehigh lump	$7 75
" egg	6 75	" egg	7 75
" stove	7 00	" stove	8 00
" chestnut ..	6 75	" chestnut	7 75
Soft Coal.			
Hocking lump	4 00	Brier Hill	5 75
" nut	4 00	Blossburg	8 00
Willow Bank lump	4 50	Cumberland	8 00
" " nut	4 00		

Montreal. Nov. 27, 1876.

Specially reported by Messrs. ROBERT C. ADAMS & Co.

Wholesale per ton of 2240 lb.

Scotch Steam	$4 25	Cape Breton Steam	$3 75
Pictou "	4 25	Newcastle Smiths	5 50

Anthracite at retail, per 2000 lb., delivered.

Egg	$6 25	Chestnut	6 25
Stove	6 75		

Hamilton, Ont. Nov. 27, 1876.

Specially reported by H. BARNARD, Dealer in Coal.

Grate	$5 75
Egg	5 75
Stove	0 00
Nut	5 75
Lehigh Lump	6 50
Smithing	0 00
Bituminous retail	5 50
" steam	4 00
Coke	6 75

Freights

Representing the latest actual charters up to Dec. 1, 1876.

Per Ton of 2240 lb.

PORTS.	From Philadelphia.	From Baltimore.	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me	....	....	....	....
Albany	....	....	...	....
Alexandria	....	....	....	....
Amesbury, Mass	....	....	....	1 75
Bangor, Me	....	....	....	1 50
Bath, Me	....	2 00	2 10	1 50
Baltimore	....	....	....	....
Boston, Mass	1 75	2 00	2@210	1 25
Bridgeport, Ct	1 15†	1 80	1 70	60
Bristol, R. I	1 50	....	....	90
Cambridgeport, Mass.	1 80	....	....	1 30
Derby	....	....	....	....
Dighton	....	....	....	....
East Cambridge	1 80	....	....	1 30
Fall River	1 50	1 80	1 70	90
Hackensack	1 12†	....	....	....
Hallowell, Me	....	....	....	....
Hartford	....	2 30	....	1 35
Hoboken	†95	....	1 45	40
Hudson	1 10	....	....	....
Jersey City	†95	....	1 45	40
Lynn, Mass	....	....	....	†1 40
Middletown	....	....	....	1 15
Mystic	....	....	....	....
Newark	†96	....	....	....
New Bedford	1 60	1 80	1 75	90
Newburyport	1 75	2 20	2 20	1 40
New Haven	1 10†	1 80	1 70	60
New London	1 45	1 80	1 70	80
Newport	1 45	....	....	75
New York	†95	1 60	1 50	40
Norfolk	80	....	70	75
Norwalk	1 10†	....	....	80
Norwich	1 60	....	....	90
Pawtucket	1 75	....	....	‡ 90
Philadelphia	....	....	....	....
Portland	1 80	2 00	2 20	1 25
Portsmouth, N. H	1 75@1 8.	2 20	2 25	1 40
Providence	1 45	1 80	1 70	90
Poughkeepsie, N. Y ...	1 10†	....	....	....
Rockport	....	....	....	....
Saco	....	....	....	....
Sag Harbor	....	....	....	....
Salem, Mass	2 00	2 00	....	1 25
Salisbury Pt., Mass..	....	....	....	....
Stamford	1 10†	....	....	....
Stonington	....	....	....	....
Taunton	.. .	....	....	....
Troy	1 15†	....	....	....
Warren, R. I	....	....	....	1 00
Wareham	....	....	....	....
Washington	75	....	....	....
Weymouth	....	....	....	....
Wilmington, Del	....	....	....	....

* And discharging and towing. † And discharging. ‡ And towing. § 3c. per bridge extra.

Rates of Transportation on Anthracite Coal to Tide Ports.

We refer to our issue of Nov. 14th for these freights.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, Dec. 1, 1876.

American Pig.—There has been no business worthy of note during the week under review, and it is generally acknowledged that trade is as dull as it is possible for it to be. In the absence of business it is impossible to determine what prices are being secured, but it is generally conceded that the market is quite weak. To dispose of a large block of iron, very marked concessions from our quotations would have to be made. The situation in the iron trade, which under natural influences is bad enough, is made worse by the continued political uncertainties. We quote No. 1 foundry at $21@$22; No. 2, $19@$20; and forge, $19@$19.50.

Scotch Pig.—Owing to the advance in prices in Glasgow, holders in this market have become quite firm in their quotations. Were it not for the great depression that exists in the whole iron market, an advance would probably take place. We note sales of 150 tons of Coltness in lots at full prices. We quote Coltness at $29@$29.25; Eglinton, $26; and Glengarnock, $28.

Rails.—We note a sale of 600 tons of iron rails delivered in Providence at $37.50, equal to about $33.50 at the mills. We also note a sale o. 2,000 tons of steel rails on private terms. We quote iron rails at mills at $36@$40, and steel at $50@$54.

Old Rails are without business and nominal at $20.

Scrap.—No. 1 wrought is nominal at $26.

Baltimore. Nov. 29, 1876.

Specially reported by Messrs. R. C. HOFFMAN & Co.

We have no change to note in the iron market since our last report. Sales small, at quotations.

Baltimore Charcoal	$29@32	Anthracite No. 3	$20@21 00
Virginia Charcoal	28@33	Mottled and White	17@19 00
Anthracite No. 1	23@24	Charcoal C. B. Blooms	62 50@65
" No. 2	20@22	Refined Blooms	55@60 00

Boston. Nov. 27, 1876.

PIG is quiet, the further decline in coal increasing the belief that the supply from Eastern Pennsylvania will, in a few months or even weeks, be very large and almost unmanageable. We quote all the way from $19 to $24; Scotch pig is a trifle firmer, based on cables of an advance abroad, and we quote Gartsherrie $31 and Eglinton $29 currency.

BAR is in light demand at about $48 for refined and $39 for common. Nails are quiet, without further change in quotations.

STEEL is in steady but not large demand, and we leave our quotations unchanged. The annual report of the Old Colony Railroad states that "over fifty miles of track are now laid with steel rails, some of which have been in use eight or nine years, and show at this time no perceptible signs of wear. It is evident that there is a great economy in the use of steel rails, and that a considerable saving in expense can be made by substituting steel for iron on fifty or sixty miles more of the road, where there is considerable traffic. The directors, believing that rails have reached the lowest point in price, and that the present is a good time to purchase, have contracted for the purchase or about 4,000 tons of steel rails, to be delivered during the winter."—*Commercial Bulletin.*

Chattanooga, Tenn. Nov. 27, 1876.

Specially reported by J. F. JAMES, pig iron broker, etc., 233 Market Street.

There is no change in the condition of our market since last report. Stocks are light and orders daily refused.

Tenn. Ala. and Ga. Charcoal, No. 1 foundry	$20@ 21
" " " " No. 2 foundry	19@ 20
" " " " gray forge	16@ 17
" and Georgia coke, No. 1 foundry	18@ 19
" " " " No. 2 foundry	17@ 18
" " " " gray forge	15@ 16
White and Mottled	14@ 15
Tennessee and Georgia cold-blast car wheel	21@ 22
Alabama " "	21@ 22
Old Rails	cash 20 50
Cast Scrap	" 13
Wrought Scrap	" 18@ —

Cincinnati. Nov. 28, 1876.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

Our market is very quiet and the demand light. We quote:

CHARCOAL.

Hanging Rock, No. 1 Foundry	$24 00@25 00	4 mos
" No 2, "	@23 00	4 mos
" Mill	21 00@	4 mos
Tennessee, No. 1, Foundry	23 00@	4 mos
Tennessee, No. 2, "	22 00@	4 mos
" Mill	21 00@	4 mos
Missouri, No. 1, Foundry	@	4 mos

STONE COAL.

Ohio, No. 1, Foundry	22 50@23 00	4 mos
" No. 2, "	21 50@22 00	4 mos
Ohio Mill	20 00@21 00	4 mos
Missouri, No. 1 Foundry	25 00@	4 mos
" No. 2, "	24 00@	4 mos
" Mill	23 00@	4 mos

CAR-WHEEL.

Hanging Rock, C. B	40 00@45 00	4 mos
Tennessee "	25 00@32 00	4 mos
Missouri "	30 00@33 00	4 mos
Alabama "	25 00@32 00	4 mos

BLOOMS.

Charcoal	60 00@ 65 00—cash

SCRAP IRON.

Cast	500.@ 85—cash
Wrought	1 00@1 40—cash

Cleveland, Ohio. Nov. 27, 1876.

Messrs. C. E. BINGHAM & Co., quote as follows:

Per gross ton, on four months' time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.

No. 1, Lake Superior Charcoal	27 00@
No. 2, " " "	26 00@
No. 1, Anthracite	24 50@
No. 2, "	22 50@
No. 1, Bituminous	24 50@
No. 2, "	22 50@
American Scotch, No. 1, Cherry Valley	@
" " B—1, " "	@
" " No. 2, " "	@
No. 1, Massillon	25 00@
B—1, "	24 00@
No. 2, "	21 00@

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	27 00@
No. 4 " " "	27 50@
Nos. 5 and 6 "	27 00@

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal	26 50@

FORGE IRON.

No. 1, Gray	22 00@
White and Mottled	20 50@

Louisville. Nov. 28, 1876.

Specially reported by Messrs. GEORGE H. HULL & Co.

HOT BLAST—CHARCOAL.

No. 1 Foundry, from Hanging Rock Ores	$24 00@25 00
No. 2 " " "	22 00@23 00
No. 1, Mill, from " "	20 00@21 00
No. 1, Foundry, from Alabama, Georgia and Tennessee ores	22 00@23 00
No. 2, Foundry, from Ala., Geor'a and Tenn. ores	21 00@22 00
No. 1, Mill, from " " " "	20 00@21 00

HOT BLAST—STONE COAL AND COKE.

No. 1, Foundry, from Hanging Rock Ores	22 00@23 00
No. 2, " " " "	20 00@21 00
No. 1, Mill, " " " "	20 00@21 00
No. 1, Foundry, from Ala. Ga. and Tenn. Ores	21 00@22 00
No. 2, " " " "	20 00@21 00
No. 1, Mill, " " " "	20 00@21 00
No. 1 Foundry, from Missouri Ores	— @ —
No. 2 " " " "	— @ —
No. 1 Mill, from Missouri Ores	23 00@25 00

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock Ores	35 00@43 00
" " Tennessee "	26 00@28 00
" " Alabama and Georgia Ores	28 00@40 00
" " Kentucky Ores	28 00@42 00

Pittsburg, Pa. Nov. 28, 1876.

Specially reported by A. H. CHILDS.

The market continues dull, and the mills are, for the most part, buying only for immediate necessities, and but little at a time, in the belief that prices will be no higher during the winter. Some round lots are reported to have changed hands, but such sales are effected only by tempting concessions and on private terms.

No. 1 Foundry	24 00@25—4 mos
" 2 "	22 00@23 "
Gray Forge	20 00@22 "
White and Mottled	17 50@19 "
Warm blast Charcoal	33 00@28 "
Cold blast Charcoal Western	40 00@45 "

Richmond, Va. Nov. 27, 1876.

Reported by ASA SNYDER, Esq.

Charcoal pig iron is dull. Hope when the distraction of the recent election is over this interest will revive.

Virginia Cold Blast Charcoal Pig Iron	$27 to $33
" Warm " " " "	24 to 28
" " " Coke " " 1 X	23 to 24
" " " " " " 2 X	21 to 22
" " " " " " 3	20 to 21
" Anthracite 1 X	— to —
" " 2 X	— to —
" " 3	— to —

San Francisco, Cal.

From the *Commercial Herald*, Nov. 23, 1876.

Several hundred tons of Eglington Pig Iron have recently been placed at $28.50, 60 days. Sydney Block Tin we quote at 17¼c. The steamer for Panama carried 252,417 lb. Pig Lead en route to New York.

St. Louis. Nov. 28, 1876.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

Our market remains firm at quotations. No change to report.

CHARCOAL.		STONE COAL.	
Missouri No. 1 Found'y.	$23@25	Missouri No. 1 Fd'ry.	25@26
" " 2 "	22@23	" " 2 "	23@24
" Gray Mill	22@23	" Gray Mill	22@23
H. Rock No. 1 Found'y.	25@26	" White & Mt'd	21@22
" " " 2 "	23½@24		
" " Gray Mill	23@24	COLD BLACK CHARCOAL.	
Tenn. No. 1 Foundry	23½@24	*All Numbers.*	
" " 2 "	22½@23		
" Gray Mill	22½@23		
COKE.		Hanging Rock	35@46
Alice H. R. Ex No. 1 F'y.	26 00	Tennessee	30@33
" " 1 "	25 00	Kentucky	30@33
B, " 1 "	24 50	Missouri	28@30
" " 2 "	23 50	Georgia	28@30
Forge	23 50	Alabama	28@30
Chat., Tenn. No. 1 Fd'y.	25 00	Assorted Bar Iron $2 25, rates.	
" " " 2 "	23 50	No. 1 Wrought Scrap 95c. cwt.	
" " Forge	22 50	Heavy cast " 70 "	
" " White Mtl'd	21 00	Light " " 40 "	

Montreal. Nov. 23, 1876.

We quote: Pig Iron. Eglinton and Clyde; $19.15@$20.00; Summerlee $20.50@21.00; Langloan & Gartsherrie $22.50@23; Calder $21.50@22.50; Hematite $26.@27. Bar, per 100 lbs., Scotch and Staffordshire $2.@2.05; best do., $2.25@2.35, Swedes and Norway 4.75@$5; Lowmoor and Bowling, $6.@6.50: *Canada Plates* per box, Gamorgan and Budd, $3.60@3.75; Garth and Penn $3.75@3.85; Arrow $3.75@3.85 Hatton $3.40@3.50.—*Monetary Times.*

METALS.

NEW YORK, FRIDAY EVENING, Dec. 1, 1876.

THE continued uncertainties in the political situation, and the Thanksgiving festivities, have helped to make one of the quietest weeks we have had this year. There has not been a sufficient number of sales to denote what prices are ruling, so that we continne, in most cases, those of a week ago.

Gold Coin.—During the week under review gold has ranged from 109⅝ to 108¼ and closed at 109.

Bullion.—Quite an advance is shown all around. We quote 118¼; San Francisco, 9 per cent. discount, while London quotes at 55d.@55¼d. The latter price is higher than has ruled in London for months past. This is owing, in part, to an improvement in exchange on India, but also largely to the two millions or more of silver which our Bond Syndicate and private parties have imported from the other side for the government subsidiary coinage operations. There may also be some speculation, having its origin on our Pacific Slope, going on in London, for the purpose of fixing higher rates in San Francisco. Gold bars remain unchanged, at par, to ¼ per cent. premium.

Copper.—The amount of business done in this article during the week has been entirely in a small way and quite limited in the aggregate, 20¾c.@20¾c. are asked. The last boat left the Lake region on the 25th ult. The stock of copper in this market is said to be smaller than it has been for a number of years.

Tin.—Straits in London is quoted at £78 10/, and in this market at 18c., while L. & F. is quoted at 17¾c.; Banca, 20c.; and Refined 18c.—prices all in gold. There is no business worthy of note being done.

Tin Plates.—These are very quiet, and quoted as follows, gold, per box: charcoal tins, $6.75@$7, and ternes, $6@$6.50; coke tins, $6, and ternes, $5.50@$5.75.

Messrs. ROBT. CROOKS & Co., of Liverpool, under date of Nov. 16, say of Tin Plates: "Buyers are showing greater disposition to place orders, and manufacturers a corresponding reluctance to book further at rates ruling—several, in fact, being quite firm at advanced quotations. The market is decidedly strengthened by the sharp rise in the price of Tin, which makes the cost of Tinning on an average 6d per box more than it was a fortnight ago,"

Lead.—150 to 200 tons of Western lead has been sold during the week at 5·90c.@6c. currency. Small jobbing lots are quoted at 6·05c. We have been noting for weeks considerable shipments of lead from San Francisco for this port. It is now said that there are 2,500 tons to arrive during the next three months. This, with the other lead that will probably reach this market, in liberal quantities, by other routes, should, at least, keep this market weak. Soft Missouri is quoted at 6·15c. currency laid down here.

Spelter and Zinc.—Domestic spelter continues very quiet and nominal at 6¼c.@6¾c. currency. Sheet zinc is quoted at 8⅛@8¾c. currency.

Antimony continues quiet at 13¼c.@13¾c.

Quicksilver.—Quotations remain unchanged and as follows: in San Francisco, 57¼c.@60c.; in this market, 62¼c., gold per lb.; and in London, £8 10/ per flask.

The San Francisco *Commercial Herald*, of Nov. 23, says of quicksilver. "The spot supply is light, yet in the absence of any especial export demand prices ease off. Some 1,500 flasks have already been secured for the China steamer for Dec. 1st. Holders generally ask 57½c., but it can be purchased at 55c. for shipment.

FINANCIAL.

New York Stocks.

NEW YORK, FRIDAY EVENING, Dec. 1, 1876.

THE occurrence of Thanksgiving Day has restricted the week's operations in the market to five days, the dealings in these aggregate 89,107 shares, a decrease of nearly 63,000 shares from our last. The coal stocks, without exception, show a decline. We note that a large number of the transactions are based on future deliveries of stock, at 30@60 days options at 2 and 3 per cent. below our present quotations. The large interest accounts now falling due, and to mature on the first of the year, will certainly tax the ability of some of the companies to meet, especially those who have been conducting business during the six months past at a loss.

Delaware, Lackawanna and Western Railroad.—57,255 shares of this stock have changed hands at from 71⅛ to 69 closing at 69⅛. Interest payments will be due on the following bonds of this company during the present month: Delaware, Lackawanna and Western RR. convertible bonds, bonds of the Chester Railroad, Greenc Railroad, Syracuse, Binghamton and New York Railroad, and consolidated mortgage bonds of the Morris and Essex Railroad.

The striking mechanics from the company's shops at Scranton have resumed work.

New Jersey Central Railroad.—The quotations of this stock have ranged from 36⅜ to 34¼, closing at 34¼, with sales aggregating 24,205 shares.

Delaware and Hudson Canal Company.—2,275 shares represent the week's dealings in this stock, at quotations ranging from 71⅛@69, the latter figure being the final price. Work on the company's road and in their mines has been reduced to three-quarter time. Owing to the favorable weather the canal is still open, and it is hoped that the 45,000 tons of anthracite now stocked at Honesdale can be shipped before the close of navigation. This will be a benefit to those employed in the company's mines, as it is the intention of the company, should they succeed in shipping their present stock to refill the coal-pockets at Honesdale with anthracite after the close of navigation.

Quicksilver Mining Company.—This stock shows a decided advance, owing, undoubtedly, to the advanced rates for quicksilver. The transactions for the week amount to nearly 4,000 shares.

Duncan Silver Mining Company.—An adjourned meeting of this company will be held in Boston on the 6th inst.

Rockland Nickel Mining Company.—The coupons on the bond of this company will be paid on presentation at the company's office in New York.

Mariposa Land and Mining Company.—This stock is unchanged. The sales for the week aggregate 1,55h

shares. The latest advices from the mine states that the tunnel is now in 2,278 feet, and that everything about the mine is in a progressing condition.

This company has levied an assessment of $1 per share on both the common and preferred stock, delinquent Dec. 11.

Joplin and Girard, Kansas, Railroad.—The switch on this road is now completed to the coal beds, two or three miles east of the main survey, where about 50 miners are engaged in rigging machinery, etc., preparatory to commence taking out coal.

Rock Island and Mercer County Railroad.—This local road is now finished from Rock Island, Ill., to Richland Grove, about seventy-five miles south. It runs through a fine coal region.

Mineral Valley Railroad.—The stockholders will meet in Columbus, Ohio, December 20, to vote upon the proposition to increase the capital stock from $300,000 to $1,000,000, and also to make further arrangements to proceed with the construction of the road immediately.

Portland, Dalles and Salt Lake Railroad.—About four miles of this road have already been graded, and work is being pushed forward with energy, with the intention of completing it to Malade, Oneida County, Idaho, a distance of fifty miles, the ensuing winter. Another road is said to be also in contemplation from Corinne to the Mammoth coal mines, recently discovered in the Western part of Wyoming. The coal vein is represented to be 100 feet thick, with only a few thin strata of rock between, and to cover an area of not less than thirty square miles, the coal making a splendid coke.

Coupons and Interest are due on the bonds of the following during the present month:

Delaware, Lackawanna and Western Railroad.—Coupons on its Convertible bonds.

Chester Railroad.—Coupons paid by the Delaware, Lackawanna and Western Railroad.

Greene Railroad.—Coupons paid by the Delaware, Lackawanna and Western Railroad.

Syracuse, Binghampton and New York Railroad.—Coupons on the 2d mortgage bonds paid by the Delaware, Lackawanna and Western Railroad.

Morris and Essex Railroad.—Coupons on the consolidated mortgage bonds paid by the Delaware, Lackawanna and Western Railroad.

Milwaukee Iron Company.—The coupons on the bonds of this company fall due during the present month.

Rockland Nickel Mining Company.—Coupons.

New Central Coal Company.—The annual meeting of this company will be held on the 12th inst.

The Spring Mountain Coal Company announces a semi-annual dividend of *four* per cent., payable December 11.

Quotations and Sales of Stocks and Bonds.

For the week ending Dec. 1, 1876.

STOCKS.

	Highest	Lowest	Closing	Shares sold.
Pennsylvania Coal Co	—	—	220	12
Consolidation Coal Co	—	—	32	—
Spring Mt. Coal Co	—	—	†60	—
American Coal Co	—	—	*54	—
Maryland Coal Co	—	—	*10	—
Del., Lack., and West. RR. Co	71⅞	67¾	69½	57,255
New Jersey Central RR. Co	36⅜	33¾	34¼	24,205
Delaware and Hudson Canal Co	71½	69	69	2,275
Quicksilver Mining Co. pref'd	23	17	21½	1,000
" " " Common	15½	11½	13⅜	2,810
Mariposa Land & Min. Co. pref'd	5	4⅛	4½	1,550
St. Louis & Iron Mountain RR	—	—	10	—
Total Shares sold				89,107
Sales for the week previous				151,725
Decrease				62,618

* Nominal. † Asked.

BONDS.

	Inter'st	Sales.	Price.
Del., Lack. & West. 2d M	M. & S.	....	.... @108
" " " 7's Con'ble	J. & D.	....	.... @100
Cent'l RR. of N.J., 1st M., New	F. & A.	22,000	109 @109½
" " " 1st Cons	.....	18,000	77½@ 83
" " " Convert'le	M. & N.	14,000	76½@ 80
Lehigh & W.-B'e, Con. Guar'd	.....	40,000	63 @ 64½
Am. Dock & Imp. Mt. Bonds	J. & J.	5,000	65 @ 66
Del. & Hud. Can., 1st M., 1891	.....	5,000	... @105½
" " " 1884	.. ....	5,000	.... @103¼
" " " 1877	.....	....	.... @101½
" " " Coup. 7's, 1894	.....	2,000	.... @ 98
" " " Reg'd 7's, 1894	.....	.....	.... @ ....
St. L. & Iron Mountain, 1st M	F. & A.	18,000	.... @103¾
" " " 2d M	M. & N	.....	.... @ 70
Chesapeake & Ohio 6's, 1st M	.....	....	.... @ 31
" " Ex. Coupon	.....	.....	.... @ 20
Mariposa Gold Loan con. 7s	.....	.....	.... @100⅝
Total sales		$129,000	

Closing quotations, in the absence of sales, represent the latest prices bid.

Philadelphia Stocks.

PHILADELPHIA, Thursday Evening, Nov. 30, 1876.

WITH a single exception we note a slight decline in the quotations of Philadelphia stocks. The transactions for the week aggregate nearly 77,000 shares, a decrease of about 12,000 shares from the business reported in our last.

Pennsylvania Railroad.—23,608 shares of this stock have changed hands at from 46¼@45¼.

Reading Railroad.—This stock closes materially lower. The transactions amount to nearly 23,000 shares. This stock sold down to 20¾, which is a decline equal to nearly 5 per cent. as compared with the price ruling a week ago.

Lehigh Coal and Navigation Company.—This stock has sold to the extent of nearly 30,000 shares, and closes at an advance equal to 1¼ per cent. The regular dividend on the stock of this Company, which should have been announced on the 28th inst., was passed. This course has been generally commended, in view of the unpromising condition of the coal trade and the inexpediency of drawing upon the reserve dividend fund, which is stated amounts to $650,000. The December interest payments on the bonds of this Company are quite large; probably aggregating $100,000.

Coupons and interest are due on the bonds of the following companies during the present month:

Camden and Amboy Railroad.—Interest paid by the Pennsylvania Railroad Company.

Lehigh Coal and Navigation Company.—Six per cent. gold loan, consolidated mortgage loans, and convertible six per cent. loan interest and coupons.

Lehigh Valley Railroad.—Seven per cent. bonds of Pennsylvania and New York Canal consolidated mortgage bonds, 1st mortgage registered bonds, consolidated annuity bonds, and consolidated mortgage sterling gold bonds, coupons and interest.

Pennsylvania and New York Canal and Railroad.—Seven per cent. bonds, coupons.

Pennsylvania Railroad Company.—Consolidated mortgage coupon and registered bonds.

Philadelphia and Reading Railroad.—Consolidated mortgage loan registered interest and coupons, and coupons on the 1st mortgage bonds of the Colebrookdale Railroad.

Swedesboro Railroad.—Coupons paid by the Pennsylvania Railroad.

United New Jersey Transportation Company.—Loan of 1869. Coupons paid by the Pennsylvania Railroad.

Chesapeake and Delaware Canal Company.—The interest on the bonds of this company falls due during the present month.

Auction sales of stocks and bonds for the week have been as follows:

Dunbar Iron Company.—Coupons.

Bechtelville Iron Company.—$16,500 coupon 7s, guaranteed by the Reading Railroad Company at 55 per cent.

South Mountain Iron Company.—$10,000 3d mortgage 7s@27¾ per cent.

Broad Top Railroad.—$105 1st mortgage 7s@45 per cent.

Huntington and Broad Top Railroad.—The contract for the construction of the Sandy Run branch of this road has been awarded, and work has already been commenced with a large force of men on the first two miles. This section is to be completed by Feb. 1, 1877. The semi-bituminous coal developments on Sandy Run are of such nature as to warrant the building of this branch.

Pennsylvania Transportation Company.—The pipe lines owned by this company from Geible Farm to Millerstown, Pa., Millerstown to Petrolia, and Central Point to Armstrong County line, are advertised for sale in an action for debt, by the Sheriff of Butler County, Pa.

Quotations and Sales of Stocks and Bonds.

For the week ending Nov. 30, 1876.

STOCKS.

	Highest	Lowest	Closing	Shr s
Lehigh Valley RR. Co	49½	48¾	49	794
Pennsylvania RR.	46⅜	45½	45¾	23,608
Reading RR.	23⅜	21¼	21⅛	22,596
Lehigh Coal and Nav. Co	28⅞	26⅛	27⅞	29,395
Penn. Canal	—	—	*9	—
Buck Mountain Coal Co	—	—	*25	—
Fulton Coal Co	—	—	*3½	—
Locust Mountain Coal Co	—	—	—	—
Westmoreland Coal Co	—	—	*85	—
St. Nicholas Coal Co	—	—	*1	—
Cambria Iron Co	—	—	14½	330
Crane Iron Co	—	—	*25	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co	—	—	65	7
Total shares sold				76,700
Sales for the week previous				88,861
Decrease				12,161

* These quotations are nominal.

BONDS.

	Sales.	Price
H. and B. T. RR. 1st mortgage, 7s	$ —	— @107
" " " 2d " "	—	— @102
" " " 3d " cons	—	— @ 38
Lehigh Valley RR. Con. mtg. 6s	17,000	97⅞@ 98¼
" " " 7s, 1910	5,000	— @114
" " " 6s Reg	—	— @109
" " " 6s coup	—	— @108
Pennsylvania RR., 1st mtge. 6s	1,000	— @108
" " gen. " cou. 1910	—	— @107
" " gen. " 6s, reg	—	— @106½
" " Cons. M. 6s reg	10,000	— @ 99¾
Phil. & Reading RR. Con. M. 7s Reg	2,000	— @ 96½
" " " G. M. 7s, coup	—	— @100
" " " Gen. M. 7s reg.	—	— @103
" " new convertible 7s	5,800	71 @ 72
" " 6s 1880	—	— @103½
" " Cons M. 7s coup	12,000	— @100½
" " debenture 6s	—	— @ 65
Phil. & Reading C. & I. Co. Deb. 7s	—	— @ 69
" " Helfenstein tract	1,000	— @ 65
Lehigh Coal & Nav. Co., 6s '84	9,100	103 @103¼
" " " RR. 6s, '97	1,500	— @101¼
" " " con. 7s	—	— @ 90
" " " 6s gold loan	—	101¾@102
" " " Conv. gold loan	7,000	— @101¼
Penn. Canal, 6s	—	— @ 72
Penn. and N. Y. Canal, 7s	—	— @111¼
Ches. and Del. Canal, 6s	—	— @ 85
Susquehanna Canal, 6s	—	— @ 68
Delaware Division Canal, 6s	—	— @—
Susquehanna Coal Co. 6s	17,000	— @ 78
Buck. Mount Coal Co. 6s	—	— @—
Penn. Gas Coal Co. 6s	—	— @—
Honeybrook Coal Co. 7s	—	— @—
Total amount of sales	$88,400	

Closing quotations, in the absence of sales, represent the latest prices bid.

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & CO., Bankers and Brokers, Room 7 Traveller Building, 31 State Street, Boston.

BOSTON, THURSDAY EVENING, Nov. 30, 1876.

THE market during the week has been intensely dull and tending to lower prices, reaching the lowest point yesterday, when Duncan was freely sold at 6, but at this price the clique again came in the market and began buying, which also frightened a good many of the shorts into buying also and ran the price up again to $7, the market closing strong at 6¾ bid. International also felt the turn of the tide, and advanced from sales at 9-16 to ⅝ bid. Calumet is firm at 172 bid, with occasional sales of small lots at that. Franklin is heavier at 14⅛ asked, 13¾ best bid. Quincy is slightly weaker at 47 bid. In the others there is nothing doing. We have no second board this afternoon, the brokers adjourning over to Friday, consequently the market is dull, it being kind of a broken week.

Gold and Silver Stocks.

AMERICAN MINING AND STOCK EXCHANGE.

NEW YORK, FRIDAY EVENING, Dec. 1, 1876.

NEARLY 40,000 shares comprise the dealings (whatever that may mean) in the American Mining and Stock Exchange during the business of the five days just closed; of this amount the Grant Mining Company figures in the transactions of the board to the extent of 12,550 shares or about one-fourth of the total sales. It is said that a new election for Directors of the Board will be held on the 11th inst., and that there will be two calls of stocks instead of one, as at present. It is also intended to allow no one to deal in stocks who is without a place of business.

The warning which we gave the new American Mining Stock Board some time ago was unfortunately not heeded, and the questionable manner of conducting sales to which we referred are still permitted. The consequences have been such, as might have been expected, the best men became or are becoming disgusted with it, and do not hesitate to express this opinion, and the new Board is likely to lose the support which alone could make it a success. It requires more than the flickering activity of stocks based on improved mining claims to constitute a satisfactory business, and the course adopted has been such, that, had there been any tendency to a revival of interest in mining investments, it would cause serious injury to the cause the board was organized to advance. As it is, it is simply making it more difficult to bring about this revival when the proper time does come, and is bringing unnecessary discredit on honorable gentlemen who are unable to control the policy of the Board, though they still allow their names to be used in its management.

A CORRECTION.—An erroneous statement in our last issue, that the New York Stock Exchange had removed all restrictions on its members from joining the American Mining Board, should have read "from joining the New York Mining Stock Exchange," an entirely different organization, and the revived form of the old Mining Stock Board that did business here some years ago.

California.—Daily yield, 450 tons of ore, keeping the mills all steadily running up to their full crushing capacities. The ore breasts on the 1,500 and 1,600-feet levels never looked better or yielded a finer quality of ore than at the present time. The returns from the mills indicate an increase over the bullion production of last month of about $200,000. The south drift on the 1,600-feet level, running through the centre of the ore vein to connect with the north winze sunk below that level, is steadily advancing at the rate 2½ feet per day, the face still in rich ore. The connecting drift between the C. and C. shaft and the ledge on the 1,550-feet level, has been cleaned out and repaired and the hoisting of ore commenced from that portion of the mine. The completion of the C. and C. side track of the railroad now enables the shipping of ore to the Carson river mills. The raising of ore through the C. and C. shaft is an important feature, as it will greatly facilitate the production of a sufficient amount of ore to keep the mills all running during the Winter months. The rock in the face of the west drift from the 1,650-feet station in the C. and C. shaft has been quite hard during the past week, but will shortly change to a softer character as the ledge is approached. Good progress is being made. This drift is now 300 feet, and will have yet to run about 250 feet to strike the ore vein. The lift pump at the 1,650-feet level is in place, and sinking the main shaft has been resumed with the usual energy.

The operations of this mine since the date when it began paying dividends have been as follows:

Month ending.	Dividend.	Product.
May 7	$1,080,000	$1,609,500
June 7	1,080,000	1,478,000
July 4	1,080,000	1,402,000
August 5	1,080,000	2,062,400
September 4	1,080,000	1,793,700
October 5	1,080,000	1,291,000
November 6	1,080,000	1,178,200
Total	$7,560,000	$10,814,800

It will be noted that the yield last month was the lightest since the work of crushing ore was commenced last April. About 60 per cent. of the October product was in gold. The reserve was drawn upon to pay the dividend on the 15th. In the early part of last April the stock was selling at an average of $60 per share, though before the close of that month it fell to $75. On the day following the payment of the first dividend, in May, it realized $80 per share. With the exception of a little spurt in June, when it rose to $84, the market has been invariably under $80, and for the most part under $70. On the 17th it was squarely down to $46, the lowest this year, a decline of $44 since April, equal to a nominal depreciation of $23,760,000 on the whole number of shares, less the dividends.

Consolidated Virginia.—Daliy yield, 400 tons of ore, that being all that the mills can crush. The ore breasts are showing splendidly, and the yield of bullion will be greater for November than it has been for the past two months. The north drift on the 1,700-feet level has been cleaned out and repaired, and work again resumed in the face. This drift has penetrated nearly 400 feet into the Consolidated Virginia ground, and must before long

MINING STOCKS.

AMERICAN MINING AND STOCK EXCHANGE.

Name of Company.	Location.	Feet on Vein.	Capital Stock.	*a* No. of Shares.	Total Assessments Levied.	Date and Amount of Last Assessment per share.	Total Dividends paid.	Date and Amount of Last Dividend per share.	Closing Quotations *g* American Currency. Sat.	Mon.	Tues.	Wed.	Thurs.	Fri.	Shares sold during the week.
Alpha Cons. G. S.	Nevada,	300	$ 3,000,000	30,000	$180 000	Aug. 12, '75, $1.	....	.....	$12 75	$41 00	$38 37½	$36 25		$38 50	900
Belcher, G. S.	Nevada,	1,040	10,400,000	104,000	660,400	April 14, '71, $1.	$15,397,200	April 10, '76, $1.	15 75	15 25	14 87½	15 00		14 62½	640
Best and Belcher, G. S.	Nevada.	545	10,080 00	10c,800	136,192	July 13, '74, 50c.	....	.....	52 00	51 00	46 50	47 50		47 50	690
Bullion, G S.	Nevada	943½	13,00 ,00	130,000	2,052,000	Sept. 22, '76, $2.50.	....	.....	37 37½	36 00	35 50	32 75		....	950
Caledonia, G. S.	Nevada,	2,188	10,000,000	100,000	1,210,000	Aug. 28, '76, $1.00.	....	.....	12 37½	12 00	11 87½	*11 25		11 37½	1,2 0
California, G. S.	Nevada,	600	54,000, 00	540,000	....	.....	7,560,000	Nov. 15, '76, $2.	58 50	*60 00	54 25	55 00		55 00	150
Centennial, G.	Califor.	66 acres	1,000,000	100,00c *b*	**	.....	....	.....	....	....	*9 00	....		....	....
Chollar Potosi, G. S.	Nevada,	1,4c0	2,800,000	28,000	1,282,000	June 26, '76, $5.	3,080,000	Feb. 10, '72, $1.	*87 00	81 00	81 00	77 75		77 00	330
Cleveland, G.	Colo.	3,715	250,000	25,00 *b*	....	.....	....	.....	9 12½	9 12½	8 87½	8 87½		9 12½	4,400
Cons. Hercules & Roe, S	Colo.	10,500	1,000,000	100,000	**	.....	120,000	.....	....	....	....	....		....	....
Cons. Imperial, G. S.	Nevada,	468	50,c00,000	500,000	125 000	July 25, '76, 25c.	....	.....	3 50	3 50	4 37½	2 50		2 87½	300
Cons. Virginia, G. S.	Nevada,	710	54,000,000	540 000	411,200	June 11, '73, $3.	24,840,000	Nov. 11, '76, $2.	53 co	....	54 50	52 00		....	60
Confidence, G. S.	Nevada,	130	2,496,000	24,960	243,840	March 18, '73, $1.	78,000	May 1, '65, $8.33½	14 50	....	14 50	*13 00		....	220
Crown Point, G. S.	Nevada,	600	10,0.0,000	100,000	1,173,370	Oct. 26, '76, $1.	11,588,000	Jan. 12, '75, $2.	10 00	10 12½	*10 75	9 87½		....	700
Eureka Cons. G. S. L.	Nevada,	..	5,000,000	50,000	100,000	May 26, '76, $1.	1,000,000	Aug. 5, '75, $1.	....	15 00	....	....		....	....
Exchequer, G. S.	Nevada,	400	10,000,000	100,000	280,000	Sept. 23, '76, $1.	....	.....	14 37½	14 50	12 00	14 25		14 00	900
Gould and Curry, G. S.	Nevada,	621	10,800,000	108,000	2,018,000	Dec. 11, '76, $1.	3,934,800	Oct. 10, '70, $10.	15 75	15 75	15 75	10 50		13 00	800
Grant, G. S.	Nevada,	1,000	10,000,000	100,000	....	.....	....	.....	6 87½	6 75	7 00	7 25		7 12½	12,550
Hale & Norcross, G. S.	Nevada,	400	11 2c0,000	112,000	2,247,000	Oct. 10, '76, $1.	1,598,000	April 10, '71, $5.	....	8 50	7 25	7 75		7 62½	1,700
Hukill, S.	Colo.	3,288	1,000,000	10,000	**	.....	20,000	Nov. 1, '76, $1	....	....	....	....		....	.....
Indian Queen, S.	Nevada,	1,000	3,000,000	60,000	....	.....	60,000	.....	....	....	....	....		....	.....
Julia Cons, G. S.	Nevada,	3,000	11,000,c00	110,000	110,c00	Sept. 11, '76, $1.	....	.....	7 00	7 00	*6 50	6 37½		6 50	900
Justice, G. S	Nevada,	2,100	10,500,000	105,000	1,502,500	Sept. 14, '76, $5.	....	.....	25 00	29 25	27 50	26 50		27 50	1,250
Kentuck, G.S.	Nevada,	95	3,000,000	30,000	270,000	Dec. 3, '74, $1.	1,252,000	March 8, '70, $5.	11 62½	12 00	11 62½	11 25		....	750
Kossuth, G. S.	Nevada,	2,700	5,400,000	108,000 *c*	405,000	Aug. 15, '76, 50c.	....	.....	....	2 12½	*2 00	1 00		*2 10	400
Leopard, G. S.	Nevada,	1,500	5,c0 ,00.	50,000	50,000	March 31, '76, $1.	137,500	Nov. 15, '76, 50c.	6 75	7 50	7 25	7 co		....	650
Luzerne Mining Co.	Colo.	4,200	5,020,000	500,000	**	.....	....	.....	1 87½	1 87½	2 25	2 25		2 37½	4,000
Mer. and Min. Tun. Co.	Colo.	32,020	500,000	50,000	**	..	....	.....	4 50	4 62½	4 62½	....		4 62½	2,350
Merrimac, S	Mass.	600	10,020,00	100,8co	100.80	Sept. 5, '76, 50c.	....	.....	4 00	4 12½	4 25	3 25		3 co	1,200
Mexican, G. S.	Nevada,	1,500	500,000	50,000 *b*	**	.....	10,00c	Nov. 10, '76, $1.	27 00	27 50	....	26 25		*25 87½	600
Morning Star	Nevada,	1,600	8,000,c00	80,000	....	.....	....	.....	....	....	....	....		....	.....
Northern Belle, S.	Nevada,	1,600	5,000,000	50,000	....	.....	900,000	Nov. 15, '76, $1.	*36 co	*36 00	*7 50	*37 75		....	.....
Ophir, G. S.	Nevada,	675	10,080,000	100,800	2,034,400	May 14, '75, $2.	1,394,400	March 9, '64, $4.	49 00	48 37½	48 62½	47 75		48 75	580
Original Comstock, G.S.	Nevada.	....	10,000,000	10,000	....	.....	....	.....	1 12½	87½	....	....		25	1,150
Overman, G. S.	Nevada,	1,200	3,840,000	38,40c *b*	2,222,280	Oct. 21, '76, $3.	....	.....	98 75	*99 50	97 50	98 50		....	310
Pleasant View	Colo.	1,200	200.000	20,000 *b*	**	.....	....	.....	....	....	....	1 62½		*1 75	.....
Raymond and Ely, G. S.	Nevada,	5,000	3,000,000	30,000	510,000	Nov. 5, '75, $3.	3,075,000	Sept. 10, '73, $3.	4 50	5 75	5 00	*6 50		6 12½	900
St. Joseph Lead Co.	Missou.	2600 acs.	1,000,000	100, 00	....	.....	210,000	.....	6 50	6 50	6 50	6 12½		6 00	200
Santiago, G. S.	Nevada,	2,000	11,200,000	112,000	....	.....	....	.....	....	....	....	....		....	.....
Savage, G.S.	Nevada,	800	11,200,000	112,000	2,746,000	May 31, '76, $2.	4,460,000	June 11, '69, $3.	12 62½	12 50	10 25	11 75		10 87½	1,500
Seg. Belcher, G.S.	Nevada,	160	640,000	6,400	244,800	April 11, '76, $5.	....	.....	82 50	83 00	*84 00	*83 50		....	450
Sierra Nevada, G. S.	Nevada,	3,650	10,000,000	100,000	1,500,000	Oct. 24, '76, $1.	102,500	Jan. 16, '71, $1.	*13 25	13 25	13 00	12 25		12 00	950
Silver City, G. S.	Nevada,	3,900	6,310,000	63,100	....	.....	....	.....	62½	50	*1 50	*1 50		....	.....
Silver Hill, G. S	Nevada,	5,400	10,800,000	108,000	810,000	Sept. 18, '76, $1.	....	.....	12 25	....	*11 25	*10 co		9 87½	300
South Comstock, G. S.	Nevada,	1,500	10,000,000	100,000	44,000	May 3, '76, 10c.	....	.....	....	....	....	....		....	.....
South. California, G. S	Nevada,	1,500	5,000,000	50,000	....	.....	....	.....	....	....	....	....		....	.....
Southern Star, G. S.	Nevada,	1,500	6,000,000	600,000	....	.....	....	.....	75	75	....	....		....	200
Trenton, G. S.	Nevada,	..	10,000,000	100,000	....	.....	....	.....	....	....	....	....		....	.....
Union Cons. G. S.	Nevada,	850	10,000,000	100,000	260,000	March 3, '76, $1.	....	.....	14 00	14 75	13 00	*13 co		12 37½	450
West Belcher, G. S.	Nevada,	1,000	10,000,000	100,000	....	.....	....	.....	....	....	....	....		....	.....
Yellow Jacket, G. S.	Nevada,	1,200	12,000,000	120,000	2,718,000	Oct. 28, '76, $1.	2,184,000	Aug. 10, '71, $2.50.	17 87½	18 12½	17 00	18 00		16 62½	1,300
Young America, S.	Nevada,	1,000	3,000,000	30,000	6,000	Oct. 23, '76, 20c.	....	.....	....	....	....	....		....	.....
			Assessments levied to date, $27,647,782			Div'ds pd. to date, $53,001,400								Total sales.....	49,920

BOSTON STOCK MARKET.

									Fri.	Sat.	Mon.	Tues.	Wed.		
Allouez, C.	Mich.	..	$1,000,000	20 000 *c*	$940,000	May 9, '76, $5.	....	.....	$10 00	10 co	10 00	9 co	8 co		.....
Calumet and Hecla, C.	Mich.	2¼ mile	2,000,000	80,000 *d* i	1,200,000	.....	$11,050,000	Oct. 21, '76, $5.	171 00	171 00	171 00	172 00	172 00		.... .
Central, C.	Mich.	..	500,000	20,000 *c*	100,000	June, '62, 65c.	1,020,000	Feb. 17, '76, $5.	35 00	35 00	35 00	35 00	35 00		.....
Copper Falls, C.	Mich.	..	1,000,000	20,000 *d*	535,000.	May 10, '76,	100,000	Nov., '71, $1.	4 37½	4 50	4 25	4 00	4 00		.....
Dana, C	Mich.	..	500,000	20,000 *d*	68,000	Jan., '73, 50c.	....	.....	12⅞	12½	12⅛	12½	12½		.....
Dawson, S.	Canada.	..	1,200,000	60,000 *f*	....	.....	....	.....	14	13	12½	10	10		.....
Duncan, S.	Canada.	..	1,200,000	60,000 *f*	75,000	July, '76. 41⅔.	....	.....	8 50	7 75	7 00	6 00	6 75		.....
Franklin, C	Mich.	..	500,000	20,000 *d*	363,000	June, '68, $5.	585,000	Nov., '71, $1.	14 25	14 25	14 00	13 87½	13 75		.....
†Humboldt, C.	Mich.	..	500,000	20,000 *d*	100,000	Sept. 28, '76, 15c.	....	.....	3	3	3	3	3		.....
International, S.	Canada.	..	1,200,000	60,000 *f*	....	.....	....	.....	8⅛	75	56¾	56¼	62½		.....
Madison, C.	Mich.	..	50 ,000	20,000 *d*	123,000	Sept. 11, '74, 10c	....	.....	28	28	28	28	28		.....
Mesuard, C.	Mich.	..	500,000	20,000 *d*	160,000	April 12, '65, 50c.	....	.....	30	30	30	30	30		.....
Minnesota, C.	Mich.	..	1,000,000	20,000 *e*	436,000	June 10, '69, $1.	1,820,000	Mch. 15, '76, 50c.	1 00	1 6¼	1 12½	1 12½	1 12½		.....
National, C	Mich.	..	500,000	20,000 *e*	195,000	Oct., '75, $1.	360,000	Oct., '73, $1.	2 12½	2 12½	2 12½	2 00	2 00		.....
Osceola, C	Mich.	..	1,000,000	40,000 *d*	830 000	May 1, '76, $2.	....	.....	18 00	18 co	18 co	18 00	18 00		.....
Petherick, C.	Mich.	..	500,000	20,000 *d*	165,533	March 22, '76, 50c.	....	.....	50	50	50	50	50		.....
Pewabic, C	Mich.	..	500,000	20,000 *d*	185,000	June, '68, $3.	460,000	July, '73, $1.	2 50	2 50	2 75	2 75	2 75		.....
Phenix, C.	Mich.	..	1,000,000	20,000 *d*	817,500	Sept., '70, $3.	....	.....	....	....	....	....	....		.....
Quincy, C.	Mich.	..	*h* 200,000	20,000 *b*	....	.....	2,050,000	Oct. 28, '76, $3.	48 00	48 00	47 75	47 50	47 00		.....
Ridge, C.	Mich.	..	500,000	20,000 *d*	....	....	....	.....	5 37½	5 37½	5 25	5 25	5 25		.....
Rockland, C	Mich.	..	500,000	20,000 *d*	495.000	Jan., '74, $1.	....	.....	28	28	28	28	28		.....
Star, C.	Mich.	..	500,000	20,000 *d*	265,000	March 30, '76, 50c.	....	.....	35	35	35	35	35		.....
Superior, C.	Mich.	..	500,000	20,000 *d*	340,000	March, '74, 25c.	....	.....	12½	12½	12½	12½	12½		.....
			Assessments levied to date, $7.440,033			Div'ds paid to date, $17,445,000								Total sales	...3.000 shares.

No sales—Thanksgiving Day.

No sales—Thanksgiving Day.

G. Gold. S. Silver. L. Lead. C. Copper. *a* The par value of shares is $100, unless otherwise designated. *b* Par value $10. *c* Par value $50. *d* Par value $25 each. *e* Par value $15. *f* Par value $20. *g* Closing quotations represent the latest prices bid. Prices asked will have a * affixed. *h* Full paid. *i* On the four old companies. ** Not Assessable. †Ass. unp. aid.

make some very important developments in that portion of the mine. The drift is now perfectly dry, the water having apparently been dra ned by the C. & C. shaft. The ore breasts on the 1,550-feet level have been opened and put in good condition for supplying ore through the C. & C. shaft by means of the connecting drift on the 1,550-feet level. The 1,400-feet station at the shaft has been retimbered and put in the best working condition. The entire mine is in the best possible condition, not only for the extraction of ore, but also the forwarding of the prospecting operations in every quarter.

Justice.—Daily yield, 260 tons of ore. The ore breasts on the 400-feet level have widened out to 30 feet in width, some of the ore being very rich. The ore stopes on the 600, 700 and 800-feet levels show improvement at almost every point, some of the stopes yielding rich, black sulphuret ore, second to nothing of the kind on the Comstock. Assays of average prices of this ore gave $12,000 and upwards per ton. Crosscuts Nos. 1, 2 and 3, on the 800-ft. level, all show a decided improvement during the week. The full size of the winze now sinking below the 800-feet level is still in first-class ore. The mine has never in the past shown as well as it does now. The ore production will be increased to over 300 tons per day by the first of December, and mills enough will be added to those now employed to reduce it as fast as it is extracted.

Ophir.—Recent openings made in the ore stopes on the 1,500 and 1,600-feet levels have shown an improvement in both the quality and quantity of ore. This steady improvement indicates that the river mills will be enabled to start into full operation again in a very short time. Sinking the main incline is making excellent progress, the rock blasting out finely. The prospecting drifts on the 1,500, 1,600 and 1,700-feet levels are being pushed vigorously ahead at all points.

Savage.—The pumps are kept running at their full capacities, and at the rate of eight strokes per minute. One or two short delays have occurred during the week, caused by a disarrangement of valves, during which time the water would again commence to rise. The general progress, however, has been steady, the water being reduced to a few feet below the 2,000-feet level. As soon as the head or pressure of water is reduced the headway must necessarily be much better.

Yellow Jacket.—The drift north at the 1,940-feet level has completed connection with the drift south from the Imperial, giving a very valuable and much needed circulation of air. A cross drift is now started west at the nor h line of the mine, and another will be started east at that point. Drifting south at the 2,040-feet level is progressing in very favorable looking ground. The new shaft is sunk and timbered to the depth of 84 feet. The new machinery is in full operation and running well, and steam pumps and hose are in place ready against fire.

Julia. The main south drift on the 1,800-feet level is steadily advancing, the face in broken quartz and porphyry mixed. Two crosscuts have been started from this drift, one east and the other west, at a point 542 feet south of the main shaft. This has been done to determine the width and character of the ore vein at that point. The south drift on the 1,600-feet level is still showing improvement as it advances to the southward. The quartz is of a better character, and the appearances are that the ledge is steadily concentrating.

Imperial Consolidated.—Sinking the north winze below the 2,100-feet level is making good progress. The south drift on the 2,135-feet level from the bottom of the south winze connected with the north drift from the Yellow Jacket on Saturday last. This was an object much to be desired, as it is given a much needed and greatly beneficial flow of pure air through the entire southern portion of the mine. The north drift from the bottom of the south winze on the 2,135-feet level is making steady and favorable headway. An east crosscut from the north drift on the 2,000-feet level has just been started, to ascertain the full width of the ore vein at that point.

Mexican.—The upraise from the north drift on the 1,465-feet level is being pushed vigorously forward. The west crosscut from the same drift is showing some fine quartz mixed with spots of good ore.

Silver Hill.—Sinking the main incline is making steady progress, the bottom in hard blasting rock. The north drift on the 444-feet level is being pushed ahead at the rate of four to five feet per day. The east drift on the 600-feet level is also making excellent progress. The flow of water is steady and keeps the pumps steadily running.

Caledonia.—The flood of water encountered recently has been again overcome and sinking the shaft resumed. The north drift on the 1 100-feet level is making excellent progress, the face in ledge matter of a very favorable description.

Hale & Norcross.—The pumps are kept steadily running and the water is being gradually though slowly lowered.

Chollar Potosi.—Daily yield, 100 tons of ore, the assay value of which is $31 per ton. There is no change of value in any of the ore producing sections. Sinking the main incline is going ahead at the rate of two and one-

half feet per day. Sinking the combination shaft is also making excellent progress.

Sutro Tunnel.—Total length of tunnel 15,052 feet. Face of header in tough porphyry with occasional streaks of white quartz and tin clay seams.—*Gold Hill News*, Nov. 22.

Merrimac Silver Mining Company.—1,200 shares of this stock have changed hands at from 4¼ to 3¼ per share. We note the statement that the company are erecting smelting works at their mine near Newburyport, Mass., and in future will smelt their own ore under the direction of a superintendent from Nevada. The company will thus save some twenty-five per centum of previous expenses. Heretofore the ore from this mine has been smelted in New Jersey.

INCORPORATIONS.

We note the recent organization of the following mining companies in addition to the announcements in our issue of November 4th :

Name of Company.	Location.	Cap. Stock.
Los Angeles Oil Company	California	$1,000,000
Hite Gold Mining Company	"	10,000,000
Modoc Mining Company	"	2,000,000
Phenix Petroleum Company	"	5,000,000
Virginia Gold Mining Company	"	24,000
Red Cross Gold and Silver Mining Co.	"	10,000,000
White Cross Gold and Silver Mining Co.	"	10,000,000
Cove Mining Company	"	10,000,000
Loma Larga Mining Company	"	12,000,000
Arkansas River Placer Company	"	250,000
Mammoth Gold Mining Company	"	50,000
Syndicate Gold and Silver Mining Co.	"	10,000,000
Godfrey Gravel Mining Company	"	500,000
Pacific Coal Mining Company	"	2,500,000
Tiger Gold Mining and Milling Company	"	5,000,000
Thorp Gold Mining and Milling Co.	"	5,000,000
South West Mining Company	Colorado	50,000
Fuller Placer Mining Company	"	500,000
Melville Mining and Reduction Co.	"	120,000
Pioneer Mining and Milling Company	"	1,000,000
Centennial Tunnel Company of Colorado	"	500,000
Independence Mining Company	"	150,000
Nevada Mining Company	Nevada	5,000,000
Golden Gate Silver Mining Company	"	10,000,000
West Savage Mining Company	"	6,000,000
Miami Mining Company	Arizona	10,000,000
Diamond Mining Company	Pacific States	10,000,000
Leeds Mining Company	Nevada and Utah.	6,000,000

Gas Stocks.

NEW YORK, FRIDAY EVENING, Dec. 1, 1876.

But very little has been done in Gas Stocks during the past week. We note a recovery of about $2 per share in the stock of the Mutual, par being offered for it and $102 per share asked.

The New York Gas Commission, consisting of Mayor WICKHAM, Comptroller GREEN and Commissioner CAMPBELL, of the Department of Public Works, Invite proposals, &c., for lighting the public lamps in the different streets and avenues of the City for one year, from January 1, 1877.

The Cincinnati Gas Company made a proposition to the City Council to sell gas at two dollars per thousand feet, with the usual discount for prompt payment. This was favorably considered by the Council Committee on Light, and its passage recommended. The Committee on Law and Contracts have, however, had the matter under consideration, and recently the chairman presented a resolution, which was adopted, requesting the Gas Company to furnish a detailed statement of the cost of manufacturing gas. The point is raised that some of the public institutions of Cincinnati are manufacturing all the gas they burn at a cost of *sixty cents* per thousand feet, and that $1.90 is an outrageous charge for the City Gas Company to extort from the people.

The Chicago Gas Difficulty.—At a recent meeting of Chicago property holders resident on the westside, the following resolutions were adopted.

Resolved, That we deprecate the long-continued controversy between the city and the West Side Gas Company, and believe that its continuance will result in the courts sustaining the said company, thereby compelling the city to pay $55 for each lamp-post per year; and further, be it

Resolved, That we are opposed to the wild and hazardous scheme of lighting our streets with kerosene, believing it to be contrary to the best interests of every tax-payer, as well as to the business and property interests of our city, and more especially at the present time, when the reduction in the size of the burner and in the time of lighting, and also the reduction of the gas as proposed, makes the cost per post only about $15 per annum, while the lowest bid for lighting the posts with kerosene is about $20 per post.

Coupons and Interest are due on the bonds of the following companies during the present month.

Citizens' Gas Company, Newark N. J. Coupons.

Metropolitan New York Gas Company. Coupons.

People's Gas Company. Chicago Coupons on the Gold Bonds.

The Continental Gas Company announces that its annual meeting will be held on the 7th inst.

Rochester New York Gas Proposals.—Sealed Proposals will be received at the City Clerk's office Rochester, N. Y., addressed to the Lamp Committee of the Common Council up to noon of December 12, 1876, for the care, repair, lighting and extinguishing, furnishing oil, wicks, globes, etc., for the kerosene lamps; also for the care, repair, lighting and extinguishing and furnishing gas for the gas lamps, all night and every night for one year. Contract, if let, to take effect the 1st day of January. Bids will also be received for the same work on the present system.—HENRY BRINKER, Chairman of Lamp Committee.

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad st., N. Y.

Companies in New York and Vicinity	Cap. Stk.	Par.	last Divid.	When Paid.	Bid.	Askd.
			pr.c			
Mutual, N. Y.	$5,000,000	$ 100	2½	Oct. '76	100	102
" " Bonds	90,000	1,000	†3½	Aug. '76		109
NewYork, "	4,000,000		5	Nov. '76	135	136
Metropol. "	2,500,000	100	5	Sep. '76	140	145
" " Certf.	1,000,000	....	3½	" "	102½	104½
" " Bonds	500,000	1,000	3½	Dec. "		102½
Harlem "	1,850,000	50	4	Aug. '76	105	—
Manhattan "	4,000,000	50	10	July "	238	—
Brooklyn, B'klyn	2,000,000	25	5	Nov. '76	179	181½
Nassau "	1,000,000	25	4	Jan. '76	78	—
" " Certf.	700,000	1,000	3½	Nov. '76	95	—
People's "	1,000,000	10	3½	Jan. '76	50	55
" " Certf.	300,000	1,000	3½	July '76	88	90
" " Bds	325,000	....	3½	Aug. "		95
Metropol. "	1,000,000	10	3½	Nov. '76	75	77½
Wmsburgh "	1,000,000	50	3	Oct. '76	130	—
" " Certf.	1,000,000	....	3½	July "	101	102½
Citizen's "	1,200,000	20	2½	Jan. '76	95	100
" " Certf.	320,000	1,000	3½	Oct. "	98	100
J. C. N. J.	750,000	20	5	July, '75	100	—
Contl. Westch. N. Y.	466,000	50	4	July, "	90	—
Subur'n " "	390,000	50				90

† Gold.

COMPANIES OUT OF TOWN.

We are reported no change in the quotations of the out of town companies, which, in the absence of transactions, are nominal. Our issue of the 4th ult. contains the prices of these, as were generally prevailing on that date.

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NOTICE.

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Engineering and Mining Journal,
Has been appointed Sole Agent for the United States for

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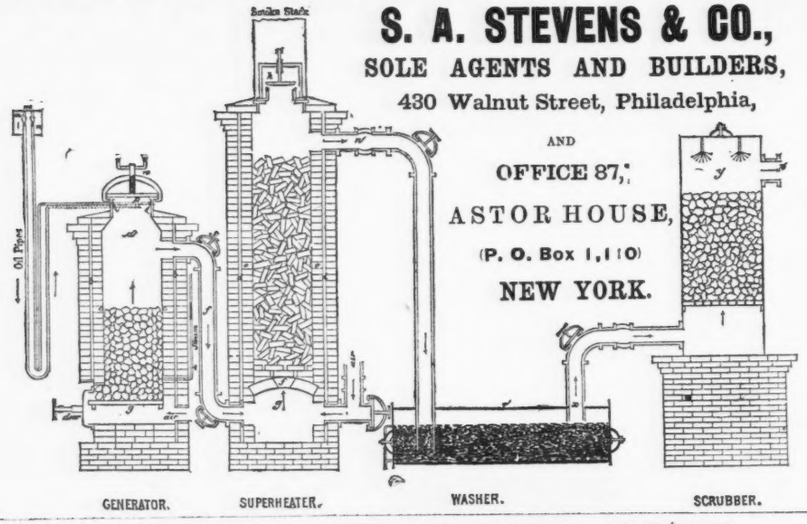

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